Appendix 4.1 Cumberhead West Scoping Report

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Cumberhead West Wind Farm

Part of a Coordinated Strategy for the Future of the Hagshaw Wind Cluster

EIA SCOPING REPORT

June 2020

ITPENERGISED
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A joint venture between:

3R Energy
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SCOTTISHPOWER RENEWABLES

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1. Introduction

1.1 Background and Context

Cumberhead West Wind Farm Ltd (hereafter referred to as "the Applicant") intends to apply to the Scottish Ministers for permission to construct and operate Cumberhead West Wind Farm (hereafter referred to as the "Proposed Development"), at site centre British National Grid (BNG) NS 75229 34481 (see Figure 1.1).

The Applicant intends to submit an application for the Proposed Development to the Scottish Ministers via the Scottish Government Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989. The application will be supported by an Environmental Impact Assessment Report (EIA Report) as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the EIA Regulations). This document forms the Scoping Report submitted to ECU in order to request a Scoping Opinion from the Scottish Ministers, on the content of Environmental Impact Assessment (EIA) of the Proposed Development.

The Proposed Development will consist of approximately 20 wind turbines up to 200 m blade tip height and its generating capacity will be >50 MW in total. The associated infrastructure will include site access, access tracks, crane hardstanding, underground cabling, on-site substation and maintenance building, energy storage compound, temporary construction compound(s), laydown areas, concrete batching plant, potential excavations/borrow workings and a met mast(s)

1.2 The Applicant

Cumberhead West Wind Farm Ltd is a joint venture between local business 3R Energy and ScottishPower Renewables (UK) Limited. 3R Energy was established in 2009, with its head office now situated in Lanark. The company was initially established to help farms and rural businesses benefit from renewable energy, with the mainstay of the business being farm sized wind turbines, CHP systems and biomass boilers. More recently, 3R Energy has moved into the development of commercial-scale wind farms and has grown a pipeline of projects totalling over 300MW.

3R Energy is part of a family group of companies which also includes: Mitchell Energy Ltd, Holz Energie UK Ltd (a wholly owned UK import franchise of the German wood-gas CHP manufacturer, Holz Energie Wegsheid), Mitchell Farming Partnerships and William Mitchell & Sons (WMS) Ltd, based at Newtonhead Farm Rigside and Hazelside Farm Douglas respectively, which manage the farming assets of the Group. Together the Group:

- owns and manages 3,500 acres of land in the Douglas Valley
- has farmed the land for over 120 years
- generates a combined annual turnover of ca. £6m
- employs 18 people on a full and part time basis

As a local company, 3R Energy is committed to working with the communities closest to the Hagshaw Wind Cluster for the long term to develop and deliver successful projects which create significant and tangible benefits for the local area.

ScottishPower Renewables is part of the ScottishPower group of companies operating in the UK under the Iberdrola Group, one of the world's largest utility companies and a world leader in renewable energy. ScottishPower now only produces 100% green electricity – focussing on wind energy, solar, smart grids and driving the change to a cleaner, electric future. The company is committed to speeding up the transition to cleaner electric transport, improving air quality and over time, driving down bills to deliver a better future, quicker for everyone.

ScottishPower Renewables is at the forefront of the development of the renewables industry through pioneering ideas, forward thinking and outstanding innovation. Its ambitious growth plans include expansion of its onshore wind portfolio, investment in new large scale solar deployment and innovative grid storage systems including batteries.

With over 40 operational wind farms, ScottishPower Renewables manages all its sites through its world leading Control Centre at Whitelee Windfarm near Glasgow. ScottishPower Renewables has long been involved in the Hagshaw Cluster, having owned and operated Scotland's first wind farm at Hagshaw Hill since 1996.

1.3 The Purpose of the Scoping Report

The purpose of this Scoping Report is to request a Scoping Opinion per Regulation 12 (1) of the EIA Regulations. The regulations provide for potential applicants to ask Scottish Ministers to state in writing, the information that ought to be provided by the EIA and included in the EIA Report. The Scoping Opinion is to be offered following discussion with the consultation bodies.

This Scoping Report:

- Describes the existing site and its context;
- Identifies key organisations to be consulted in the EIA process;
- Establishes the format of the EIA Report;
- Provides baseline information; and
- Describes potential significant effects and the proposed assessment methodologies for various technical assessments to be covered in the EIA Report.

This Scoping Report will be issued to the Scottish Ministers via the ECU, who will seek opinions from a range of statutory and non-statutory consultees. Where requested, the report can be made available to other interested parties.

1.4 Environmental Impact Assessment

The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require EIA if there is the potential for significant environmental effects as a result of the development (Schedule 2 development).

The Proposed Development falls within Schedule 2 of the EIA Regulations and has the potential to have some significant environmental effects. Therefore, it is the opinion of the Applicant that the Proposed Development qualifies as "EIA Development" and therefore the Applicant will submit an EIA Report, as part of the Section 36 application.

EIA is an iterative process, which identifies the potential environmental effects that in turn inform the eventual design of the proposals. It seeks to avoid, reduce, offset and minimise any adverse environmental effects through mitigation. It considers the effects arising during the construction, operation and decommissioning phases. Consultation is an important part of the EIA process and assists in the identification of potential effects and mitigation measures.

The structure of the EIA Report will follow the requirements of the EIA Regulations (Schedule 4) and other relevant good practice guidance. Essentially, the EIA Report will comprise three volumes

- Volume 1- Written Statement
- Volume 2- Figures
- Volume 3- Appendices

A Non-Technical Summary (NTS) will also be provided.

Chapters 1 to 5 of Volume 1 will comprise:

- An introduction
- A description of the site selection and design iteration process
- A description of the site and its context
- A description of the Proposed Development
- Information on the approach to EIA and determination of significance of effects
- A summary of the relevant planning and energy policy considerations

The remainder of Volume 1 will present an assessment of a range of environmental topics. Based on the available baseline environment information and the details of the Proposed Development, the environmental topics have been selected on the basis of the potential for significant environmental effects. This has determined the need to undertake impact assessment to investigate each potential effect. Each of the topics will be reported as a chapter of Volume 1. The EIA Report will reference figures and technical studies, which will correspond to Volumes 2 and 3 respectively. The following topics will be considered:

- Chapter 6: Landscape and Visual;
- Chapter 7: Ecology;
- Chapter 8: Ornithology;
- Chapter 9: Noise and Vibration;
- Chapter 10: Archaeology and Cultural Heritage;
- Chapter 11: Hydrology, Hydrogeology and Geology;
- Chapter 12: Traffic and Transport;
- Chapter 13: Socio-economics, Recreation and Tourism;
- Chapter 14: Aviation, Radar and Telecommunications;
- Chapter 15: Shadow Flicker; and
- Chapter 16: Forestry.

The EIA Report will also include a summary of cumulative effects, schedule of mitigation measures, and a summary of residual effects.

A standalone Planning Statement assessing the Proposed Development against all relevant planning and energy policy, along with a Pre-Application Consultation (PAC) Report explaining the consultation carried out with the local communities about the Proposed Development will also accompany the application for S.36 consent.

Early consultation is key in the development process, and throughout we ensure local communities and stakeholders are given the opportunity to provide feedback and are kept informed of project progress.

Due to the Government guidance issued as a result of the COVID-19 pandemic, face-to-face consultation is unfortunately not possible at present and may not be permitted for the foreseeable future. The Scottish Government has brought forward regulations (The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020) during this period which replaces the requirement for a physical, face-to-face public event with an alternative, online version.

We are committed to undertaking meaningful consultation with the local community and are currently identifying suitable alternative methods of engagement ahead of any potential online event. At this stage, these are expected to include formats such as utilising mail drops, use of a dedicated project website and project mailbox to distribute information and respond to the public, along with phone calls and virtual

meetings with Community Council members. Consideration is being given to ensure that engagement methods reflect varying levels of access to technology.

2. The Proposed Development

2.1 Site Description

The Proposed Development site adjoins an established cluster of wind farms around Hagshaw Hill (known as the 'Hagshaw Cluster') in rural South Lanarkshire, (refer to Figure 1.1). The site is located approximately 3.9km to the west of Coalburn, 5.6 km to the south-west of Lesmahagow 7.7 km west north-west of Douglas and 6.5 km north-east of Muirkirk, (distances to the nearest proposed wind turbine) (refer to Figures 2.1 and 2.5).

The site comprises a main Development Area of approximately 932 hectares (ha) of the existing Cumberhead Forest, consisting of commercial coniferous plantation and existing forestry tracks. The site boundary also includes the site access track (from junction 11 of the M74 motorway along existing and proposed tracks to the southern corner of the site) which is approximately 16 km long, as well as an existing access road leading to Station Road at Douglas West which comprises an area of 134 ha.

The site gradually rises from 270 m Above Ordnance Datum (AOD) in the north to 522 m AOD at the summit of Nutberry Hill in the south of the site. The site possesses a strong wind resource.

The surrounding land comprises open moorland to the west and south-west, farmland with some scattered individual properties to the north and north-east, with further coniferous plantation to the south and south-east. Some of the moorland adjoining the site to the west lies within the northernmost extent of the Muirkirk and North Lowther Uplands Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI).

The Birkenhead Burn Site of Special Scientific Interest (SSSI), covers a small section of the north of the site (3.11 ha) and is designated for its geological features. The SSSI is one of a network of Silurian sites in the Midland Valley of Scotland that yields important vertebrate fossil-bearing rocks.

A section of the Birk Knowes SSSI (approximately 4.03 ha) extends into the Proposed Development site, at its western boundary. The site is designated for its localised exposures of fossiliferous rock, upland habitats. It is a location that represents late Llandovery age sediments with unusual and paleontologically relevant arthropod and fish faunas.

A number of watercourses traverse the site including the Birkenhead Burn in the north-eastern corner and tributaries of the Logan Water. The River Nethan forms part of the eastern boundary of the site.

No residential properties lie within the site boundary.

As shown in Figure 1.1 the surrounding landscape includes a number of wind farm developments including operational, consented and in planning sites.

Figure 2.2 shows environmental designations within 2 km of the Proposed Development site boundary.

2.2 Proposed Development Description

The Proposed Development will consist of approximately 20 stand-alone, three bladed horizontal axis, wind turbines, an indicative layout is provided in Figure 2.3. Turbine locations are noted in Table 2.1 below:

Table 2.1 Turbine Coordinates

Turbine Number	X Coordinate	Y Coordinate
T01	274040	632413

Turbine Number	X Coordinate	Y Coordinate
T02	274037	632976
T03	273763	633399
T04	274604	632958
T05	275228	633430
T06	274537	633598
T07	273913	634052
T08	275261	634019
T09	274705	634205
T10	274516	634675
T11	275338	634609
T12	275186	635109
T13	276800	634875
T14	276224	634952
T15	275856	635269
T16	275606	635744
T17	277037	635539
T18	276528	635634
T19	276250	636121
T20	275826	636373

Although the final specification of the turbines is not known at this time, they are likely to be up to 200 m maximum tip height, each with a generating capacity of approximately 6 MW.

Access to the Proposed Development site will be taken from junction 11 of the M74 motorway, via an existing private haul road through the Douglas West Wind Farm site, then into the Cumberhead Forest via the Douglas West Wind Farm Extension site (which is currently in planning) using existing access tracks and tracks which have been created/upgraded as part of the Douglas West Wind Farm and Extension works. On leaving the Douglas West Extension site existing forest tracks will be utilised where possible, through both the consented Cumberhead Wind Farm site and operational Nutberry Wind Farm site. Crossings of various watercourses will be required along the way. Entry to the main body of the Proposed Development site will be taken in the south eastern corner of the main Development Area.

All construction materials, wind turbine components, site staff and visitors will use this route to access the site. Any timber to be removed from the site to facilitate the Proposed Development will be via the permitted forestry haul route to Station Road at Douglas West, as is presently the case.

In addition to the wind turbines associated works will be required for the following:

- Turbine foundations;
- Crane hardstandings;
- On-site access tracks between turbines and from the point of access to the turbines;
- On-site substation and maintenance building with welfare facility;
- Energy storage compound;

- On site electrical cabling between the wind turbines and the substation and energy storage compound;
- Temporary construction compound(s), laydown area(s) and concrete batching plant;
- Borrow pit workings; and
- Met mast(s)

The Applicant is in the process of identifying suitable borrow pit search areas within the site and intends on including such an area(s) within the application for consent. Should suitable borrow pit search areas not be identified within the site, the Applicant will need to make provision for the import of aggregate from a suitable off-site source.

Access works required for the Proposed Development will be optimised where possible given that the consented Douglas West Wind Farm, Cumberhead Wind Farm and proposed Douglas West Wind Farm Extension (in planning) will likely be constructed in advance. This will offer opportunities to optimise access track routing and construction efficiencies.

The parameters of the EIA will be such that an appropriate level of assessment is undertaken for a given hub height and rotor diameter, within the envelope of a maximum tip height (refer to Section 4 – LVIA). The turbine locations will evolve in response to the ongoing detailed assessment work, taking consideration of the environmental effects, terrain, current land use, technical and health and safety issues. The parameters of the Proposed Development will be explicitly identified in the EIA Report. The final locations of the turbines will be 'frozen' at an appropriate time in order to enable the EIA Report to describe fully the Proposed Development for which Section 36 consent is sought.

At present, it is estimated that the Proposed Development will have a total generating capacity of approximately 120 MW, with an energy storage capacity of approximately 30MW. Consent will be sought for an operational life of 30 years from the date of commissioning the wind turbines.

Based on a total installed capacity of 120 MW and a community benefit contribution of £5,000 per MW of installed capacity, the Proposed Development could generate up to £600,000 per annum (£18m in total) to support local groups and projects in the communities closest to the site.

2.3 Cumulative Developments

Schedule 4, regulation 5 (e) of the EIA Regulations states that cumulative effects should be considered as a part of the EIA. It will therefore be important to consider the cumulative effects of the Proposed Development in combination with other developments in the local area, including those that are currently operational, consented and in planning. The cumulative assessment will also consider the cumulative effects of different elements of the Proposed Development on environmental media and sensitive receptors, and in particular the cumulative effects upon individual and groups of receptors.

There are a number of operational and consented wind farm developments, as well as those in planning, that are in the vicinity of the Proposed Development site. Those of relevance will be considered in the cumulative assessment, with the main neighbouring projects shown in Figures 1.1 and 2.5. The methodology to be adopted for assessing the cumulative effects of wind energy developments will be in accordance with the Scottish Natural Heritage (SNH,2012) Guidance *'Assessing Cumulative Impacts of Onshore Wind Energy Developments'*. The scope of the cumulative assessment will be agreed through consultation with ECU, South Lanarkshire Council (SLC), and SNH.

Other operational and consented wind farms as well as those at the application stage, within 35 km of the Proposed Development, are illustrated and listed on Figure 4.3 (see Chapter 4, Landscape and Visual Impact Assessment, below).

It should be noted that this record will be updated throughout the EIA process, up to an agreed point prior to submission of the application. We welcome any further information from stakeholders on additional proposed wind farm developments that should be considered.

3. Planning and Energy Policy Context

Project Need and the Renewable Energy Policy Framework

The EIA Report will describe, in summary, the renewable energy policy framework and associated need case for renewables, identified as a matter of both law and policy, at international, European and domestic levels.

The Proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning, energy policy and climate change objectives. The clear objectives of the UK and Scottish Governments will be summarised, in relation to encouraging increased deployment and application of renewable energy technologies, consistent with sustainable development policy principles and national and international obligations on climate change.

The UK Government has stated[1] (March 2020) that on 27 June 2019, a new legally binding target to reach net zero greenhouse gas emissions by 2050 came into UK law. By 2050, the UK will need an ultra-low carbon power sector to meet this economy wide net zero emissions target. In parallel, generation will need to increase to meet future demand and to achieve this, low carbon electricity generation will need to quadruple by 2050.

At a Scottish Government level, a "Climate Emergency" was declared by the First Minister in April 2019. Furthermore, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 received Royal Assent on 31 October 2019. The Act sets a legally binding 'net zero' target for Scotland for 2045 (with challenging interim targets), five years ahead of the date set for the whole of the UK.

The Proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning and energy policy objectives. Reference will be made to the clear objective of the Scottish Government to encourage increased deployment and application of renewable energy technologies and in particular onshore wind, consistent with sustainable development policy principles and national and international obligations on climate change.

The Proposed Development would clearly make a contribution to the attainment of renewable energy, electricity and climate change targets at both the Scottish and UK levels and the quantification of this contribution would be described. The description of the renewable energy policy framework will also refer to the Scottish Government's Climate Change Plan, Energy Strategy and Onshore Wind Policy Statement.

National Planning Policy and Guidance

Reference will be made to various national planning policy and guidance documents including:

- The National Planning Policy Framework 3 (NPF3) and the emerging NPF 4[2];
- Scottish Planning Policy[3] (SPP), noting that NPF 4 will, in effect, replace NPF3 and the SPP;
- Scottish Government web-based Renewables Guidance[4];
- The Scottish Climate Change Plan, and emerging update expected to be published in April 2020;
- Scottish Government policy and good practice guidance on community benefit funding and community shared ownership.

[1] 'Consultation on proposed amendments to the Contracts for Difference (CfD) scheme for low carbon electricity generation'. Issued by the Department for Business Energy and Industrial Strategy (BEIS), (March 2020).

[2] NPF 4 is due to be laid in parliament for consultation around September 2020, URL: https://blogs.gov.scot/planning-architecture/2019/10/08/national-planning-framework-4-the-essentials/ (accessed 27.02.2020)

[3] URL: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (accessed 27.02.2020)

[4] URL: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (accessed 27.02.2020)

Local Development Plan

The planning policy context applicable to the site will be taken into account in the iterative EIA design process. The relevant planning policy framework will also be described in the EIAR.

The statutory development plan for the site comprises the South Lanarkshire Local Development Plan (the LDP) (adopted June 2015) and associated Supplementary Guidance (SG), specifically SG 10 'Renewable Energy' (adopted, 2015).

The South Lanarkshire Landscape Capacity Study for Wind Energy (SLLCS) adopted in February 2016 is a technical study which supports and informs the SG for Wind Energy. It would also be referenced.

The South Lanarkshire Tall Wind Turbines: Landscape Capacity, Siting and Design Guidance (SLTWT) (2017) is an addendum to the SLLCS (2016) which focuses on the capacity of the landscape in South Lanarkshire to accommodate taller turbines and provides further guidance on local siting and design. This study supplements the SLLCS and would also be referenced.

Key LDP policies will include Policies 1,2,3,4,11,15,16,17, and 19.

The emerging LDP2 and associated SG will also be considered. It is expected that LDP2 will be adopted in 2020.

It should be noted that a Planning Statement will be provided with the application (but separate from the EIA Report) which will contain an assessment of the accordance of the Proposed Development with the relevant policy and guidance documents as referred to above.

4. Landscape and Visual

4.1 Introduction

It is acknowledged from the outset that, in common with almost all commercial wind energy developments, some landscape and visual effects would occur as a result of the proposals, including some significant effects.

A key principle of the European Landscape Convention is that all landscapes matter and should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area.

It is therefore proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and an LVIA Chapter be included in the EIA Report. The LVIA will be undertaken by Chartered Landscape Architects, who are experienced in the assessment of large scale, on shore wind energy projects and are fully familiar with the landscape in and around this part of South Lanarkshire.

It is proposed that the LVIA will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

4.2 Baseline Description and Landscape Character

The Proposed Development site adjoins an established cluster of wind farms around Hagshaw Hill (Known as the 'Hagshaw Cluster') in rural South Lanarkshire. The site is located approximately 3.9 km to the west of Coalburn, 5.6 km to the south-west of Lesmahagow 7.7 km north-west of Douglas and 6.5 km north-east of Muirkirk (distances to the nearest proposed wind turbine). The surrounding landscape comprises open

moorland to the west and south-west, farmland with some scattered individual properties to the north and north-east, with coniferous plantation to the south and south-east.

4.2.1 Landscape Character

The Site is located within South Lanarkshire. The South Lanarkshire Landscape Character Assessment was undertaken by Ironside Farrar in 2010 and forms the basis of the South Lanarkshire Landscape Capacity Study 2016 (LSC 2016), and its addendum, Tall Wind Turbines: Landscape Capacity, Siting and Design Guidance, September 2017 (TWT 2017). TWT 2017 provides further information on landscape capacity for turbines taller than 120m to blade tip, which was the limit of the assessment in LSC 2016.

The study defines fourteen landscape character types (LCT) within seven regional character areas. The landscape character types are further defined into principal landscape units. The Site is located within LCT 7a – Rolling Moorland: Forestry.

The key characteristics of LCT 7a include '*distinctive upland character created by the combination of elevation, exposure, smooth, rolling, or undulating landform, moorland vegetation and the predominant lack of modern development*, *'areas share a sense of apparent wildness and remoteness which contrasts with the farmed and settled lowlands'*, and *'extensive views over the surrounding Ayrshire and Lanarkshire lowlands from the hilltops'*. In relation to sub type 7a specifically, the character is noted to be '*influenced by areas of significant afforestation'*.

The TWT 2017 provides brief guidelines with regards to the location of tall turbines (defined as 120m to 200m) but does not provide guidance on landscape sensitivity.

The TWT 2017 assesses the capacity of LCT sub type 7A in which the Site is located as being medium in relation to turbines 150m - 200m to blade tip.

From the review of the overarching characteristics of the landscape in the area around the Site, it is considered that the landscape in which the proposed wind farm would be located does have capacity to accommodate wind energy development of the type proposed. This matter will be considered in further detail through the detailed assessment of landscape character to be set out within the LVIA.

4.3 Landscape Planning

4.3.1 Landscape Designations

The site is not located within any of the identified Special Landscape Areas (SLAs) in South Lanarkshire. Landscape designations in the wider study area are illustrated at Figure 4.1.

4.4 Consultation to Date

A provisional Zone of Theoretical Visibility (ZTV) and wirelines from key viewpoints have been issued to SLC, ECU and East Ayrshire Council (EAC) for review and comment. The ZTV and wirelines issued were based upon the 20 turbine layout shown in Figure 1.2 and a 200m tip height.

4.5 Relevant Guidance and Legislation

The LVIA shall be undertaken in accordance with the principles of best practice, as outlined in published guidance documents, notably the third edition of the Guidelines for Landscape and Visual Assessment (GLVIA3), (Landscape Institute and the Institute for Environmental Management and Assessment, 2013).

The methodology and assessment criteria proposed for the assessment has been developed in accordance with the principles established in this best practice document. It should be acknowledged that GLVIA3 establishes guidelines, not a specific methodology. The preface to GLVIA3 states:

"This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand."

The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose.

As part of the development of the proposed methodology, consideration has also been given to the following documents:

- Guidelines for Landscape Character Assessment, (2002) Countryside Agency and SNH;
- Landscape Character Assessment Guidance for England and Scotland: Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity, (2002) The Countryside Agency and SNH;
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (March 2012) SNH;
- Siting and Design of Wind farms in the Landscape, Version 3 (February 2017) SNH;
- Visual Representation of Wind farms – Version 2.2 (February 2017), SNH;

4.6 Assessment Methodology

4.6.1 Distinction between Landscape and Visual Effects

In accordance with the published guidance, landscape and visual effects shall be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the Proposed Development on the physical and perceptual characteristics of the landscape and its resulting character and quality; and
- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

4.6.2 Types of Landscape and Visual Impacts Considered

The LVIA will address all phases of the Proposed Development, and effects will be considered during the construction phase, when the Proposed Development is being built (temporary effects), following completion of the Proposed Development (permanent effects) and during decommissioning at the end of the project (temporary effects).

The LVIA will not only assess the impacts associated with the turbines, but also any related impacts resulting from any anemometer masts, control building/substation, energy storage compound, underground cabling, site tracks and access roads.

Consideration shall be given to seasonal variations in the visibility of the Proposed Development and these will be described where necessary.

4.6.3 Study Areas

In order to assist with defining the study area, a digital ZTV model was created as a starting point to illustrate the geographical area within which views of development on the Site are theoretically possible. This was based on a 'bare-earth' scenario, whereby the screening effect of areas of existing vegetation or built features in the landscape are not taken into account. The ZTV was modelled to blade tip height using the currently proposed turbine height of 200m and is presented at Figure 4.2.

The ZTV is a useful tool used to provide a focus on the area and receptors that are most likely to be affected by a Proposed Development but should always be subject to verification in the field. In this regard, site visits shall always form the primary basis in understanding the actual likely visibility of development at the Site.

Having reviewed the ZTV and with regard to best practice guidance, it is proposed that the LVIA will consider an initial 35km radius study area. Detailed assessment will then be provided for a 15km section of this study area, which it is considered represents a proportionate extent of the study area and the limit within which any potential significant effects might occur.

For the cumulative assessment, consideration was initially given to a 60km radius from the Site, as recommended by SNH best practice guidance. Following this review, it is proposed that a 20km study area be adopted to consider cumulative effects, which is considered represents a proportionate extent of the study area and the limit within which any potential significant cumulative effects might occur. It is also proposed that for single turbines, only those which are 50m high or taller are included in the LVIA. Cumulative sites within 20 km of the site are illustrated on Figure 4.3 and listed in Appendix 4.1.

It is also proposed to carry out a separate Residential Visual Amenity Study covering all properties located within 2km of all proposed turbines, should any properties lie within 2km of a turbine in the design freeze layout. This additional assessment would be presented in an appendix to the LVIA Chapter and would complement the assessment of visual receptors within the LVIA, providing further detail in relation to the effect on the views and amenity from different parts of each property and its curtilage.

4.6.4 Visualisations

For each of the viewpoints, visualisations will be prepared in line with SNH best practice guidance (Visual Representation of Wind farms – Version 2.2, February 2017).

A digital model will be generated to enable the production of wirelines of the Proposed Development from locations throughout the study area to help identify the scale, arrangement and visibility of the proposed turbines. These images will be reviewed on site to assess how natural and built screening would affect visibility of the Proposed Development.

Each of the wireframe models for the viewpoints within 20km of the site will then be developed further into photomontages to help illustrate the predicted impact of the Proposed Development.

It is proposed that surrounding consented, but not yet constructed schemes will be digitally added to photomontages of baseline photographs, in order to illustrate the predicted baseline situation that will be in place when the wind farms are fully constructed.

Ancillary elements such as the permanent anemometer mast, access tracks and the substation will be shown in photomontages for viewpoints within 5 km when they would be visible. Beyond 5 km it is considered unlikely that the ancillary elements would form more than a limited element of the entire Proposed Development when compared to the turbines.

Photography for each of the viewpoints will also be taken in accordance with the guidance contained in *Visual Representation of Wind farms – Good Practice Guidance*.

4.6.5 Visible Turbine Lighting Assessment and Visualisations

Turbines over 150m are required to be fitted with visible red aviation warning lighting. As a consequence of this, it is best practice for LVIAs for wind farms fitted with such lighting to include an assessment of the effects which would arise from this. A detailed proposed methodology for the assessment is set out in Appendix 4.1.

4.6.6 Significance of Effects

The purpose of an LVIA when produced in the context of an EIA is to identify any significant effects on landscape and visual amenity arising from the Proposed Development.

The EIA Regulations 2017 do not define a threshold at which an effect may be determined to be significant. In certain other environmental disciplines, there are regulatory thresholds or quantitative standards which help to determine the threshold of what constitutes a significant effect. However, in LVIA, any judgement

about what constitutes a significant effect is the judgement of a competent and appropriately qualified professional assessor.

The level (relative significance) of the landscape and visual effects is determined by combining judgements regarding sensitivity of the landscape or the viewer, the magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.

The level (relative significance) of effect shall be described as Major, Major/Moderate, Moderate, Moderate/Minor, Minor, Slight/No Effect or No Effect. No Effect may also be recorded as appropriate where the effect is so negligible it is not even noteworthy.

In the assessment, those effects described as Major, Major/Moderate and in some cases Moderate may be regarded as significant effects as required by the EIA Regulations. These are the effects which the authors of the LVIA consider to be most material in the decision making process.

4.6.7 Sensitivity

4.6.7.1 Landscape Features

The nature or sensitivity of an individual landscape feature or element reflects its susceptibility to change and the value associated with it. Sensitivity is therefore a function of factors such as the feature's quality, rarity, contribution to landscape character, degree to which the particular element can be replaced and cultural associations or designations that apply. A particular feature may be more 'sensitive' in one location than in another often as a result of local value associated with the feature. Therefore, it is not possible to simply place different types of landscape feature into sensitivity bands. Where individual landscape features are affected, professional judgement is used as far as possible to give an objective evaluation of its sensitivity. Justification is given for this evaluation where necessary.

The nature or sensitivity of individual landscape features has been described as very high, high, medium, low or very low.

4.6.7.2 Landscape Character

The nature or sensitivity of landscape character reflects its susceptibility to change and any values associated with it. It is essentially an expression of a landscape's ability to accommodate a particular type of change. It varies depending on the physical and perceptual attributes of the landscape including but not necessarily limited to: scale; degree of openness; landform; existing land cover; landscape pattern and complexity; the extent of human influence in the landscape; the degree of remoteness/wildness; perception of change in the landscape; the importance of landmarks or skylines in the landscape; inter-visibility with and influence on surrounding areas; condition; rarity and scenic quality of the landscape, and any values placed on the landscape including any designations that may apply. Additionally, for a consideration of landscape character during low light levels, a key further consideration is the extent to which existing artificial light sources are present in the landscape during low natural light levels.

In this assessment, the nature or sensitivity of landscape character shall be considered with reference to published landscape character areas/types. Information regarding the key characteristics of these character areas/types shall be extrapolated from relevant published studies. Together with on-site appraisal, an assessment of landscape sensitivity to visible wind turbine aviation lighting shall be undertaken, employing professional judgement.

The nature or sensitivity of landscape character shall be described as very high, high, medium, low or very low.

4.6.7.3 Visual Receptors

The nature or sensitivity of a visual receptor group reflects their susceptibility to change and any values associated with the specific view in question. It varies depending on a number of factors such as the occupation of the viewer, their viewing expectations, duration of view and the angle or direction in which they would see the site. Whilst most views are valued by someone, certain viewpoints are particularly highly valued for either their cultural or historical associations and this can increase the sensitivity of the view.

It is important to appreciate that it is the visual receptor (i.e. the person) that has a sensitivity and not a property, public right of way or road. Therefore, a large number of people may use a motorway during dusk/ nighttime, for example, but this does not increase the sensitivity of the receptors using it. Conversely, a residential property may only have one person living in it, but this does not reduce the sensitivity of that one receptor.

Where judgements are made about the sensitivity of assessment viewpoints, the sensitivity rating provided shall be an evaluation of the sensitivity of the receptor represented by the viewpoint and not a reflection of the number of people who may experience the view.

It is also important not to confuse the concept of visual sensitivity with the perception of wind turbines. It is acknowledged that some people consider wind turbines to be unattractive, but many people also enjoy the sight of them. This matter is therefore not a factor when determining sensitivity

4.6.8 Magnitude of Change

The following discussion sets out the approach to be adopted in the LVIA in relation to a specific issue arising in GLVIA3, which requires a brief explanation.

Prior to the publication of GLVIA3, LVIA practice had evolved over time in tandem with most other environmental disciplines to consider the level of effect (relative significance) principally as a function of two factors, namely: sensitivity of the receptor and magnitude of the effect (the term 'magnitude' being a word most commonly used in LVIA and most other environmental disciplines to describe the size or scale of an effect).

Box 3.1 on page 37 of GLVIA3 references a 2011 publication by IEMA entitled *'The State of EIA Practice in the UK'* which reiterates the importance of considering not just the scale or size of effect but other factors which combine to define the 'nature of the effect' including factors such as the probability of an effect occurring and the duration, reversibility and spatial extent of the effect.

The flow diagram on page 39 of GLVIA3 suggests that the magnitude of effect is a function of three factors (the size/scale of the effect, the duration of the effect and the reversibility of the effect).

For certain types of development (e.g. residential) the Proposed Development is permanent and non-reversible. For other types of development (e.g. wind and solar energy) the Proposed Development is for a time-limited period and would be largely reversible at the end of the scheme's operational period. Reversibility of a Proposed Development is a material consideration in the planning balance but does not reduce the scale of the effect (i.e. the 'magnitude' in the traditional and commonly understood sense of the word) during the period in which the scheme is operational. In this regard, it would be incorrect to report a lesser magnitude of change to a landscape or view as a result of a time-limited effect or the relative reversibility of the effect.

For clarification, the approach taken in this LVIA will be to consider magnitude of effect solely as the scale or size of the effect in the traditional sense of the term 'magnitude'. Having identified the magnitude of effect as defined above, the LVIA will also describe the duration and reversibility of the identified effect, taking these factors into account as appropriate in the consideration of the level (relative significance) of the effect.

4.6.9 Assessment of Cumulative Effects

The LVIA will also consider the potential for any cumulative effects to arise. The requirement for consideration of cumulative effects under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 is set out in Schedule 4, as follows:

- *'5. A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved development, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources';*

This represents a change to the wording of the previous Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2010 which stated: '*A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development*'.

There is therefore no longer any requirement under the current EIA Regulations to consider the potential for cumulative impacts in relation to other developments which are yet to be awarded consent.

Notwithstanding this, it is acknowledged that current best practice guidance for cumulative impact assessment (Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH, 2012) still refers to a consideration of proposals which are '*awaiting determination within the planning process with design information in the public domain' and states that 'The decision as to which proposals in the planning / consenting system should be included in an assessment is the responsibility of the determining authority.*'

As such, it is proposed in this LVIA to consider cumulative effects caused by the development of the Site in conjunction with other sites which are either operational, under construction, consented or the subject of a full planning application. The SNH best practice guidelines identify two principle types of cumulative visual impact:

- Combined visibility – where the observer is able to see two or more developments from one viewpoint; and
- Sequential visibility – where two or more sites are not visible at one location but would be seen as the observer moves along a linear route, for example, a road or public right of way.

The guidelines state that 'combined visibility' may either be 'in combination' (where two or more sites are visible from a fixed viewpoint in the same arc of view) or 'in succession' (where two or more sites are visible from a fixed viewpoint, but the observer is required to turn to see the different sites). Each of the above types of cumulative effect will be considered in the LVIA.

In order that the cumulative assessment remains focussed on other schemes that have the greatest potential to give rise to significant cumulative effects it is necessary at the outset to decide which schemes realistically need to be considered in detail, as to consider all schemes within 35 km of the Proposed Development would simply detract attention from the key issues relating to the application. As there are several large wind farms (either operational, consented, in planning, or in Scoping) in the immediate vicinity of the Proposed Development, it is recognised that in this context, wind farms over 20 km away are highly unlikely to give rise to significant cumulative effects which would not occur in any case with the existing distribution of immediately surrounding wind farms (i.e. in the absence of the Proposed Development). It is also considered appropriate and proportionate to scope out turbines under 50 m within 10 km of the site, and under 80 m over 10 km distance from the site. The cumulative impact assessment will therefore focus primarily on those schemes within approximately 20 km of the Proposed Development.

The wind farms identified within Table 4.1 are therefore the schemes on which the discussion of the cumulative landscape and visual impact effects will be primarily focussed.

For the purposes of clarification, it should also be noted that other wind farms within 35 km of the Proposed Development will be shown on the supporting visualisations where relevant.

Table 4.1: Other Wind Farms to be Considered in Detail in the Cumulative LVIA

Site	Blade tip height of turbines	Number of turbines
Operational		
Hagshaw Hill	55 m	26
Hagshaw Hill Extension	80 m	20
Nutberry	125 m	6
Galawhistle	121.2 m +110.2 m	4 + 18
Birkhill (Harbro)	99.5 m	1
Auchren Farm	66.6 m	1
Hazelside Farm	74 m	1 operational, 1 to be constructed
Dungavel	101.2 + 121.2 m	14
Auchrobert	132 m	12
Bankend Rig	76 m	11
Andershaw	125 m	14
JJ Farm Turbine	102 m	1
Nether Fauldhouse	78 m	1
Letham Farm	51 m	1
Low Whiteside Farm	54 m	1
Yonderton Farm	51 m	1
Lochhead	100m	5
Middle Muir	136m +152m	8 + 7
Kype Muir	132m	26
Consented/ Under Construction		
Douglas West	149.9m	13
Cumberhead (and revised scheme)	126.5m (149.9 m)	11 (14)
Poniel	100m	3
Broken Cross (Wind Farm)	126.5m	7
Dalquhandy (and revised scheme)	126.5m (131 + 149.9)	15 (4 + 11)
Kype Muir Extension (Variation Application)	132m + 152m 156m, 176m, 200m + 220m	**6 + 12** 4, 3, 4 + 4
Penbreck	125m	9 (note application to increase tip height of 6 of the consented turbines)
Kennoxhead	145m	19
Broken Cross (small turbines)	55.7m	2
M74 Eco-Park	98.2m	2
Glenmuckloch	133.5m	8

Site	Blade tip height of turbines	Number of turbines
Lethans	136m to 176m	22 - 5 at 176m, 1 at 152m, 9 at 149.9m and 7 at 136m
Hagshaw Hill Repowering	200m	14
Priestgill	145m	7
In Planning		
Glentaggart	132m	5
Lowther Hills	149m	35
Douglas West Extension	200m	13

4.6.10 Nature of the Effect

The assessment identifies effects which may be beneficial, adverse or neutral. Where effects are described as neutral this is where the beneficial effects are deemed to balance the adverse effects.

For some developments (e.g. wind energy developments) it is recognised that some people consider the development to be unattractive but others enjoy the sight of it. A landscape and visual assessment for these developments therefore assumes that all identified landscape and visual effects are 'adverse' unless stated otherwise. This allows decision makers to assess a worst-case scenario.

4.6.11 Duration and Reversibility

For the purposes of this assessment, the temporal nature of each effect is described as follows:

- Long Term – over 5 years
- Medium Term – between 1 and 5 years
- Short Term – under 1 year

The LVIA also describes the reversibility of each identified effect using the following terms:

- Permanent – effect is non reversible
- Non-permanent – effect is reversible

4.7 Proposed Scope of Assessment

4.7.1 Landscape Receptors

The LVIA will consider effects upon landscape features within the site, such as vegetation. A detailed assessment of direct effects upon the character of the host landscape, alongside the assessment of indirect effects upon surrounding landscape character types and sub types/units will also be provided.

4.7.2 Visual Receptors

There are potential visual receptors in the area surrounding the Site, including parts of the settlements of Douglas, Muirkirk, Lesmahagow and Coalburn. There would be the potential for some views from the local road network, including the M74 and the A70. A detailed consideration of the potential for impacts to the visual amenity of receptors in the landscape surrounding the Site will be set out in the LVIA. This visual assessment will be informed by a selection of representative assessment viewpoints, which are set out

further below in Table 4.2 below, each of which will be illustrated with visualisations prepared in line with SNH best practice guidance.

Table 4.2: Proposed Viewpoints

ID	Proposed Viewpoint	Easting	Northing
1	Coalburn, Muirburn Place	281160	635512
2	M74 Overbridge	284424	635419
3	Lesmahagow-Hillcrest	281623	638622
4	Minor road, Brackenridge	276578	639692
5	B7086, bridge crossing Kype Water	275027	641626
6	B7068, leaving Strathaven	270787	643872
7	A71, bridge crossing Calder Water	266379	641900
8	Black Hill	283198	643552
9	A70 Rigside	287708	635192
10	Tinto Hill	295316	634372
11	Douglas-Hill Street	283981	630394
12	Auchensaugh hill	285330	627198
13	Victory Park, Muirkirk	269388	627320
14	Nether Wellwood (A70)	264483	625095
15	Cairn Table	272410	624235

4.7.3 Residential Visual Amenity

A detailed consideration with regard to residential visual amenity will also be given within in the LVIA. A Residential Visual Amenity Study (RVAS) will be prepared to consider views from any properties located within 2km of the Development in further detail.

4.7.4 Night-time Lighting assessment

Turbines over 150m are required to be fitted with visible red aviation warning lighting. As a consequence of this, it is best practice for LVIAs for wind farms fitted with such lighting to include an assessment of the effects which would arise from this. A detailed proposed methodology for the assessment is set out in Appendix 4.1.

4.7.5 Construction and Construction Processes

The LVIA will take into consideration the effects upon landscape features, landscape character and visual receptors during the construction phase of the Proposed Development

4.7.6 Operation

The LVIA will take into consideration the effects upon landscape features, landscape character and visual receptors at Year 1 and Year 15 of the Proposed Development

4.7.7 Decommissioning

The LVIA will take into consideration the effects upon landscape features, landscape character and visual receptors during the decommissioning phase of the Proposed Development

4.8 Potential Mitigation

Best practice guidance for EIA states that mitigation measures may include:

- avoidance of effects;
- reduction in magnitude of effects; and
- compensation for effects (which may include enhancements to offset any adverse effects).

The primary mitigation to be adopted in relation to the Proposed Development will be embedded within the design of the Proposed Development and will relate to the consideration that will be given to avoiding and minimising landscape and visual effects during the evolution of the Proposed Development layout. This is sometimes referred to as 'mitigation by design'.

5. Ecology and Ornithology

5.1 Introduction

The ecology and ornithology chapters will consider the potential impacts of the Proposed Development on the ecological and ornithological features present within the Proposed Development site. They will summarise the methods used to establish the baseline conditions within the Proposed Development site and its surroundings, the results of the baseline surveys, and the process used to determine the sensitivity of the habitats and species' populations present. The ways in which habitats or species might be affected (directly or indirectly) by the construction, operation and decommissioning of the Proposed Development will be assessed prior to and after any mitigation measures are considered. In addition, any cumulative effects will be considered, taking together impacts of other wind farm projects in the area, whether operational, consented or at application stage, along with the significance of any predicted effects associated with the Proposed Development.

5.2 Baseline Description

5.2.1 Ecology

5.2.1.1 Desk Study

A desk study will gather information from a variety of sources and from consultation with a number of conservation organisations, such as those outlined below:

- National Biodiversity Network (NBN) Atlas Scotland (https://scotland.nbnatlas.org/);
- Scottish Natural Heritage (SNH) Sitelink (https://sitelink.nature.scot/home) website for designated sites, and Natural Spaces (http://gateway.snh.gov.uk/natural-spaces/index.jsp) website for e.g. carbon and peatland map;
- Scottish Badgers;
- Glasgow Museums Biological Records Centre; and
- South West Scotland Environmental Records Centre.

In addition to this, ecological information available in the public domain relating to applications of the following local wind farm projects will be referred to: Douglas West & Dalquhandy DP Renewable Energy Project; Douglas West Community Wind Farm; Douglas West Extension Wind Farm; Dalquhandy Wind Farm; Hagshaw Hill Extension Wind Farm; Hagshaw Hill Repowering Wind Farm; Galawhistle Wind Farm; Nutberry Wind Farm; Cumberhead (Nutberry Extension) Wind Farm; Auchrobert Wind Farm; Kype Muir Wind Farm; Kype Muir Extension Wind Farm; and Dungavel Wind Farm (see Figure 2.5 for details).

5.2.1.2 Designated Sites

Table 5.1 details the designated sites located within 5 km of the Proposed Development that have an ecological interest. It was agreed with SNH during consultation that adverse effects on Natura sites with ecological features are unlikely, and it is therefore anticipated that all Natura sites can be scoped out of the impact assessment, with no Likely Significant Effects predicted within the context of the Habitats Regulations.

Table 5.1 Ecology Designated Sites within 5 km of the Proposed Development

Name	Distance	Qualifying Interests	Status
Muirkirk Uplands SSSI	Adjacent to Proposed Development site	Blanket bog Upland habitat assemblage	Unfavourable No Change Unclassified
Coalburn Moss SAC and SSSI	3.8 km	Active raised bog Degraded raised bog Raised bog (SSSI)	Favourable Maintained Unfavourable Recovering Unfavourable Recovering
Blood Moss and Slot Burn SSSI	4.8 km	Blanket bog	Unfavourable No Change

5.2.1.3 Field Surveys

The scope of ecology surveys was agreed through consultation with SNH in October 2019. A summary of each survey type is provided below:

Habitats: Phase 1 habitat surveys were undertaken within the Proposed Development site in 2013 as part of the Cumberhead Wind Farm project. An updated National Vegetation Classification (NVC) survey was conducted in 2019 within, and up to a 250 m buffer of the Proposed Development site boundary (excluding the existing access track and areas of the buffer out with the Proposed Development site boundary where access was restricted), to allow for indirect effects on Groundwater Dependent Terrestrial Ecosystems (GWDTEs) to be assessed and accounting for any potential micrositing. The majority of the Proposed Development site comprises mature conifer plantation, which is generally of low conservation value. The conifer plantation is interspersed with other habitats including those beside watercourses and within forest rides, which may be of greater conservation value. Other habitats recorded within the Proposed Development site include areas of blanket bog, wet modified bog, acid dry dwarf shrub heath, flushes and acid and marshy grassland.

Protected Species: Surveys were undertaken in 2019 within the Proposed Development site boundary, excluding the existing access track. Surveys were targeted towards protected terrestrial mammal species, including otter (*Lutra lutra*), badger (*Meles meles*), pine marten (*Martes martes*), red squirrel (*Sciurus vulgaris*), and water vole (*Arvicola amphibius*). The surveys also included checks for any suitable bat roost features. A watching brief was also conducted for any reptiles, namely adder (*Vipera berus*), common lizard (*Zootoca vivipara*) and slow worm (*Anguis fragilis*). The surveys recorded evidence of badger, otter and potential evidence of pine marten using the Proposed Development site. There were no potential roost features for bats (structures or trees) recorded within the Proposed Development site.

Great Crested Newts: There were no ponds visible on a 1:25,000 Ordnance survey maps within the Proposed Development site boundary, nor were any ponds recorded during the protected species surveys. A single pond is visible on the 1:25,000 Ordnance Survey map, approximately 300 m east of the Proposed Development site, adjacent to Todlaw property. It was agreed with SNH during consultation that the species is likely to be absent from the local area, based on the absence of great crested newts at other project sites within the vicinity of the Proposed Development.

Bats: Static detector surveys were undertaken to record bat activity within the Proposed Development site (excluding the access track) seasonally between June and September 2019. Detectors were deployed in 13 locations within the Proposed Development site boundary, for a minimum of 10 nights per survey. Four bat species and two bat genus were recorded at the Proposed Development site, namely common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auratus*),

Daubenton's bat (*Myotis daubentonii*) as well as *Myotis* spp. and *Nyctalus* spp. bats that were unidentifiable to species level.

Fish: Habitat surveys for fish were conducted in 2019 along all the watercourses present within the Proposed Development site boundary (excluding the access track). A watching brief was also undertaken for the presence of, and habitat suitability for, freshwater pearl mussel (*Margaritifera margaritifera*). Several of the smaller watercourses within the Proposed Development site were noted as having low habitat suitability for fish. There were a number of larger watercourses, or sections of larger watercourses, that were considered to have high habitat suitability for brown trout of all age classes including the River Nethan to the south-east, Birkenhead Burn to the north and Logan Water to the west of the Proposed Development site which flows into the Logan Reservoir.

5.2.2 Ornithology

5.2.2.1 Desk Study

A desk study will gather ornithological information from a variety of online sources and consultation with conservation organisations, such as those listed below:

- NBN Atlas Scotland (https://scotland.nbnatlas.org);
- Scottish Natural Heritage (SNH) Sitelink (https://sitelink.nature.scot/home) and Natural Spaces (http://gateway.snh.gov.uk/natural-spaces/index.jsp); and
- South Strathclyde Raptor Study Group (RSG).

In addition, ornithological information available in the public domain relating to applications of local wind farm projects listed in section 5.2.1.1 will be referred to (see Figure 2.5 for details).

Designated Sites

Table 5.2 details the designated sites located within 20 km of the Proposed Development site that have ornithological interests (refer to Figure 2.2 for locations). It should be noted that the two Sites of Special Scientific Interest (SSSIs), North Lowther Uplands SSSI and Muirkirk Uplands SSSI are coincidental in extent with the Muirkirk and North Lowther Uplands SPA. It is anticipated that the Muirkirk and North Lowther Uplands SPA will require consideration within a Habitats Regulations context, as due to the proximity of the sites, a Likely Significant Effect cannot be discounted at this stage.

Table 5.2 Ornithology Designated Sites within 20 km of the Proposed Development

Name	Distance	Qualifying Interests	Status
Muirkirk and North Lowther Uplands SPA	Adjacent to site boundary	Hen harrier (*Circus cyaneus*) Short-eared owl (*Asio flammeus*) Peregrine (*Falco peregrinus*) Golden plover (*Pluvialis apricaria*) Merlin (*Falco columbarius*) Hen harrier (*Circus cyaneus*)	Unfavourable Declining Favourable Maintained Unfavourable No Change Favourable Maintained Unfavourable No Change Unfavourable Declining
Muirkirk Uplands SSSI	Adjacent to site boundary	Hen harrier (*Circus cyaneus*) Short-eared owl (*Asio flammeus*) Hen harrier (*Circus cyaneus*), non-breeding Breeding bird assemblage	Favourable Maintained Favourable Maintained Unfavourable Declining Favourable Maintained
North Lowther Uplands SSSI	3.2km to site boundary	Hen harrier (*Circus cyaneus*) Breeding bird assemblage	Unfavourable No Change Unfavourable Declining

5.2.2.2 Field surveys

The scope of ornithology surveys was agreed through consultation with SNH (email 8th November 2019). It was considered that one year of survey effort is sufficient to allow a robust characterisation of the baseline

ornithological assemblage and usage of the Proposed Development site and surrounding area, when used in combination with the substantial information and data sets collated for other nearby projects since 2003.

The following ornithology surveys were undertaken within and around the Proposed Development site in 2019 and 2020:

- Flight activity (Vantage Point, VP) surveys: surveys started in May 2019 and will continue until April 2020. A total of five VPs have been selected to cover the Proposed Development site, following the methods as per SNH (2017[5]) guidance (see Figure 5.1 for viewshed coverage);
- Scarce breeding bird surveys (raptors and owls): 2019 breeding season within the site and 2 km buffer where access allowed, following the methods described in Hardey et al. (2013[6]); and
- Winter walkovers: 2019-20 non-breeding season within the site and 500 m buffer, concentrating on locating key species, e.g. hen harrier roost activity, as per SNH (2017[1]) guidance.

As the Proposed Development is comprised of mature conifer plantation, general upland/moorland breeding bird surveys were not considered to be required, as per SNH (2017[5]) guidance. Wader species and any other species of higher conservation value were however recorded in open areas inside and outside of the Proposed Development site during all other surveys.

As the access track to the Proposed Development is currently in existence and regularly used by forestry and wind farm vehicles and personnel, ornithology surveys of the access track were not considered to be required.

In addition to 2019/20 survey results, baseline data for the local area available over a long-term period (2003 to 2018) have shown that the species assemblage has remained relatively similar between years, as well as across different sites. In general, the local area including the Proposed Development site is of limited importance for target species, with few breeding records of raptors (e.g. no recent hen harrier or merlin breeding evidence), and low levels of site usage by foraging raptors.

Black grouse have been present within the local area over the period of baseline surveys for local projects, with a lek present within the Hagshaw Hill Extension study area. A similar variety of wader species do breed within open areas in each site (including Red-listed curlew and lapwing), although the habitat within the Proposed Development site is considered unsuitable. Golden plover is also present in the local area during migration and winter periods, although again would not likely be found within the Proposed Development site. Whooper swan, pink-footed goose and greylag goose were the only target wildfowl species regularly recorded for other projects, mainly in flight, and birds utilise the waterbody within the Dalquhandy Wind Farm site as a roosting location.

5.2.3 Guidance

5.2.3.1 Ecology

The ecology assessment will be carried out in accordance with the principles contained within the following guidance documents:

- Chartered Institute for Ecology and Environmental Management (CIEEM) (2018, updated 2019). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Version 1.1;
- Collins, J. (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition). Bat Conservation Trust;
- Historic Environment Scotland and Scottish Natural Heritage (SNH) (2018). *Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland*;

[5] Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms

[6] Hardey, J. Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) Raptors: A Field Guide for Surveys and Monitoring Raptors. Stationery Office: Edinburgh (3rd edition).

- Joint Nature Conservation Committee (2013). *Guidelines for selection of biological Sites of Special Scientific Interest (SSSI);*
- Scottish Badgers (2018). *Surveying for Badgers: Good Practice Guidelines*. Version 1.
- Scottish Executive (2006). The Scottish Forestry Strategy (SFS);
- Scottish Executive Rural Affairs Department (SERAD) (2000). *Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds (''The Habitats and Birds Directives''*). Revised Guidance Updating Scottish Office Circular No 6/1995;
- Scottish Government (2001). *European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements*;
- Scottish Government (2010). *Management of Carbon-Rich Soils*;
- Scottish Government (2013). *2020 Challenge for Scotland's Biodiversity.*
- Scottish Government (2016). *Draft Peatland and Energy Policy Statement*;
- Scottish Government (2017). *Draft Climate Change Plan-the draft Third Report on Policies and Proposals 2017-2032*;
- Scottish Government (2017). *Planning Advice Note 1/2013 - Environmental Impact Assessment*, Revision 1.0
- Scottish Environment Protection Agency (SEPA) (2017). *Guidance Note 4 - Planning guidance on on-shore windfarm developments*;
- SEPA (2017). Guidance Note 31 - *Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*;
- Scottish Government, SNH and SEPA (2017). *Peatland Survey - Guidance on Developments on Peatland;*
- SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments*;
- SNH (2013). *Planning for Development: What to consider and include in Habitat Management Plans;*
- SNH (2015). *Scotland's National Peatland Plan*;
- SNH (2016). *Planning for Development: What to consider and include in deer assessments and management at development sites* (Version 2);
- SNH, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2019). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation;* and
- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), Historic Environment Scotland & AEECoW (2019). *Good Practice During Windfarm Construction* (4th Edition).

5.2.3.2 Ornithology

The ornithology assessment will be carried out in accordance with the principles contained within the following guidance documents:

- European Commission (2010). *Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'*. European Commission, Brussels;
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester;
- Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746;

- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment, Revision 1.0 (Scottish Government 2013)
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- Scottish Natural Heritage (2009). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees;
- Scottish Natural Heritage (2016). Assessing connectivity with Special Protection Areas (SPAs). Version 3;
- Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms;
- Scottish Natural Heritage (2018a). Assessing Significance of Impacts from Onshore Wind Farms Out-with Designated Areas;
- Scottish Natural Heritage (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note;
- Scottish Natural Heritage (2018c). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- Scottish Natural Heritage (2019). SNH joint publication (2019) Good Practice during Wind Farm Construction. 4th Edition;
- SERAD (Scottish Executive Rural Affairs Department) (2000). *Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("the Habitats and Birds Directives")*. Revised Guidance Updating Scottish Office Circular No 6/1995;
- The South Lanarkshire Biodiversity Strategy produced by the South Lanarkshire Biodiversity Partnership (SLBP) which reports to the Community Planning Partnership and Partnership Board within South Lanarkshire; and
- The Scottish Biodiversity List (https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list).

5.2.4 Legislation

5.2.4.1 Ecology

The ecology assessment will be carried out in accordance with the principles contained within the following European legislation:

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora;
- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ("Water Framework Directive"); and
- Environmental Impact Assessment Directive 2014/52/EU.

The following national legislation will be considered as part of the ecology assessment:

- Wildlife and Countryside Act 1981 (as amended);
- Protection of Badgers Act 1992 (as amended);
- Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (''The Habitats Regulations'');
- Water Environment and Water Services (Scotland) Act 2003 (WEWS);

- Nature Conservation (Scotland) Act 2004 (as amended);
- Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Wildlife and Natural Environment (Scotland) Act 2011; and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

5.2.4.2 Ornithology

The ornithology assessment will be undertaken in line with the following European legislation:

- Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive');
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) ('Habitats Directive'); and
- Environmental Impact Assessment Directive 2014/52/EU.

The following national legislation is considered as part of the ornithology assessment:

- The Wildlife and Countryside Act 1981 (as amended);
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

5.3 Proposed Scope of Assessment

5.3.1 Ecology

The ecology assessment will focus on the impacts of construction, operation and decommissioning of the Proposed Development upon those ecological features identified during the review of desk-based information and field surveys. Impacts upon the following features are likely to be assessed:

- Designated sites: including direct impacts (i.e. derived from land-take or disturbance to habitats and/or protected species) and indirect impacts (i.e. changes caused by impacts to supporting systems such as groundwater or over land flow);
- Terrestrial habitats: including direct impacts (i.e. derived from land-take) and indirect impacts (i.e. changes caused by impacts to supporting systems such as groundwater or over land flow);
- Aquatic habitats: impacts are limited to the ecological impacts of changes in water conditions through potential pollution impacts; and
- Protected species: including direct impacts (i.e. loss of life as a result of the Proposed Development; loss of key habitat; displacement from key habitat; barrier impacts preventing movement to/from key habitats; and general disturbance) and indirect impacts (i.e. loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g. as a result of pollution).

It is anticipated that an appropriate assessment under the Habitats Regulations Appraisal (HRA) process will not be required for any Natura 2000 site, with no connectivity of habitats (blanket bog) likely for the closest Special Area of Conservation (SAC) (Coalburn Moss SAC approximately 3.8km from the Proposed Development site) (i.e. no likely significant effects are predicted). Due to its proximity to the Proposed Development site, effects on the Muirkirk Uplands SSSIs will be assessed as part of the EIA process.

The chapter will also assess cumulative effects arising from the combined impacts of the Proposed Development alongside other projects subject to the EIA process within a relevant search area, and their effects on a relevant reference population; for example, at a watercourse, watershed or Natural Heritage Zone (NHZ) level.

5.3.2 Ornithology

The following impacts will be assessed in full, where appropriate in relation to construction, operation and decommissioning of the Proposed Development:

- direct habitat loss for birds through construction of the Proposed Development infrastructure;
- displacement of birds through direct and indirect loss of habitat as a result of construction or decommissioning activity disturbance, turbine operation and maintenance, or visitor disturbance. This also includes barrier effects to commuting or migrating birds due to the presence of turbines or other infrastructure;
- habitat modification due to change in land cover (e.g. forestry removal) or changes in hydrological regime, and consequent effects on bird populations;
- death or injury through collision with turbine blades or other types of infrastructure associated with the Proposed Development; and
- cumulative impacts of the Proposed Development during construction, operation and decommissioning when considering other wind farm projects at a suitable landscape scale.

It is anticipated that an assessment under the Habitats Regulations Appraisal (HRA) process will be required for the Muirkirk and North Lowther Uplands SPA, as likely significant effects are predicted due to the proximity of the site. Information to inform an Appropriate Assessment will be presented in the EIA chapter to determine whether an adverse effect on the integrity of the SPA would occur. The component SSSIs will be assessed as part of the EIA process.

The chapter will also assess cumulative effects arising from the combined impacts of the Proposed Development alongside other projects subject to the EIA process within a NHZ or national level, and their effects on a relevant reference population.

5.4 Potential Impacts

5.4.1 Construction and Decommissioning Impacts and Effects

Based on the available information to date from baseline surveys and a desk-based search of results from nearby wind farm projects, the following construction and decommissioning impacts are likely to be assessed:

5.4.1.1 Ecology

- Loss of habitats of conservation value, e.g. Annex I bog or heath present in open areas, and impacts on any GWDTEs or priority peatland habitats;
- Disturbance or displacement to any protected species recorded during baseline surveys, or potentially present within the Proposed Development site;
- Potential impacts on foraging bats due to habitat loss; and
- Potential impacts on fish due to changes in water conditions through potential pollution impacts from construction related activities associated with the Proposed Development.

5.4.1.2 Ornithology

- Habitat loss/alteration associated with the Proposed Development, including loss of nesting or foraging habitat for target species, or any increased habitat suitability associated with any forest felling (e.g. for raptors, owls or black grouse); and
- Disturbance to target species (breeding raptors, owls, black grouse, waders) associated with construction or decommissioning activities; and
- Potential adverse effects on qualifying features of designated sites.

5.4.2 Operational Impacts

Based on the available information to date from baseline surveys and a desk-based search of results from nearby wind farm projects, the following operational impacts are likely to be assessed:

5.4.2.1 Ecology

- Displacement to any protected species recorded during baseline surveys, or potentially present within the Proposed Development site; and
- Potential impacts on roosting or foraging bats due to habitat loss or collision risk, particularly on any high-risk species.

5.4.2.2 Ornithology

- Displacement of target species (breeding raptors, owls, black grouse, waders) around operational turbines or other infrastructure;
- Potential collision risks associated with operational turbines for target species (most likely to be wildfowl, raptors and waders); and
- Potential adverse displacement or collision effects on qualifying features of designated sites.

5.5 Potential Mitigation

During the design process, it is proposed that turbine locations will be buffered by at least 50m from all watercourses. Where possible, all potential high GWTDEs should be avoided.

An appropriate set-back distance would be applied for forestry in relation to turbine locations, to reduce the risk of bat collisions. A Bat Mitigation Plan would be finalised prior to construction of the Proposed Development.

Good practice during construction and operation of the Proposed Development will be implemented as standard, including the provision of a Construction Environmental Management Plan (CEMP) as well as the presence of an Ecological Clerk of Works (ECoW) during the construction period. The ECoW or suitability qualified ecologist would undertake ecology surveys prior to, and during the construction period so that no protected species or habitats would be adversely affected.

Prior to construction, a Species Protection Plan and a Breeding Bird Protection Plan would be finalised which would ensure the safeguarding of any protected species present within the Proposed Development site, throughout the duration of the construction period.

Where likely unmitigated significant effects on important ecological or ornithological features are identified, measures to prevent, reduce and where possible offset these adverse effects will be proposed to reduce effects to non-significant.

6. Noise and Vibration

6.1 Introduction

The noise and vibration impact of the Proposed Development will be undertaken by ACIA Engineering Acoustics. ACIA has wide experience of well over 100 wind energy developments, nearly all at land-based UK sites, from the planning and development stages through to operation, together with the investigation of noise complaints, and of 'repowering' schemes for older wind farms. Specifically, ACIA has undertaken noise and vibration assessments for a number of wind farms within the Hagshaw Cluster.

6.2 Baseline Description

The baseline position for the existing noise environment in/around the site is that which existed before any wind turbines were built in the wider area. This means that it will not be possible to conduct background noise surveys because the background levels, i.e the levels with no operational turbines, are no longer measurable.

Noise surveys at locations already affected by existing wind energy developments are proscribed by ETSU-R-97 at page 58 (in relation to cumulative impact) which specifically states that an existing wind farm "*should not be considered as part of the prevailing background noise*". That paragraph also makes it clear that absolute noise limits and margins above background should relate to the cumulative effect of all wind turbines in the area.

As was agreed with the SLC Environmental Health Officer (EHO) in the case of the recent application for the nearby Douglas West Wind Farm Extension proposal, it is again proposed that the baseline noise measurements taken for the original Douglas West Wind Farm application (noise measurements taken in 2012 and 2015) be used for the purposes of assessing the potential noise impact from the Proposed Development.

6.3 Relevant Guidance and Legislation

The methods used to assess the likely noise impact from the array of replacement turbines (repowering scheme) will be compliant with ETSU-R-97 *The assessment and rating of noise from wind farms* and the Institute of Acoustics *Good Practice Guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise*. These documents are regarded by the Scottish Government as best practice.

6.4 Proposed Scope of Assessment

The resulting noise levels $L_{A90,10min}$ will be calculated both individually (from the matrix of Cumberhead West turbines) and cumulatively (from all turbines within a 5km radius of each receptor). The noise limits applicable to all existing wind farms in the area will be assumed to apply equally to the Cumberhead West turbines, and the noise prediction methods based on derived 10m wind speeds, as required by the Good Practice Guide, will be applied (a) individually to the proposed new turbines and (b) cumulatively to all existing and consented wind farms likely to affect noise-sensitive properties.

6.5 Potential Impacts

The operation of the proposed turbines may contribute to the ambient sound levels outside local residential or other noise-sensitive properties. The established guidelines, and the noise limits set in the light of such guidelines, seek to balance the national interest, i.e the need for renewable energy sources, with those of the local community. The objective is to indicate desirable noise levels, so that without placing unreasonable restrictions on wind farm developments, neighbouring residential properties can gain protection from excessive noise. A primary objective of the assessment is to suggest noise limits in a form suitable for adoption as planning conditions.

6.6 Potential Mitigation

If the noise limits at any receptor location, within any range of wind speeds and directions, are found to be in excess of the existing noise limits, mitigation strategies will be considered. Such strategies may include (but will not necessarily be limited to) changes to the operational characteristics of one or more turbines under software control, or the temporary 'pausing' of an individual turbine or group of turbines.

7. Archaeology and Cultural Heritage

7.1 Introduction

This section provides an overview of the Archaeology and Cultural Heritage context for the Proposed Development. It sets out the relevant legislative and policy framework and the guidance relevant to the EIA. The methodology that will be employed in the assessment is set out and an initial description of the baseline is provided.

7.2 Baseline Description

7.2.1 Inner Study Area (see below (7.4.1) for definition)

The West of Scotland Archaeology Service (WoSAS) Historic Environment Records (HER) contains records for only two heritage assets within the Proposed Development site:

- HER 9675: a large stone formerly occupying a position on the summit of Standingstone Hill was reportedly removed sometime prior to 1858. The former location is now within a commercial forestry compartment.
- HER 66522: a possible enclosure, made of turf banks 0.5m high and measuring 22m by 17m, was identified in 2016 'close to Todlaw'. Earthworks are visible at the recorded location, in a forestry ride, on modern aerial photography.

Preliminary assessment of the Ordnance Survey 1st edition map (1864) shows the Proposed Development Area as being predominantly unenclosed moorland/rough pasture; the only historic environment features marked within the site are two 'rees' (small enclosures, probably used for managing sheep) and a well. The two rees are shown on modern Ordnance Survey maps and are visible on modern aerial photography.

There are no other identifiable constraints within the Proposed Development site, which is now, with the exception of the Nutberry Hill ridge, in use as a commercial forestry plantation. A post felling walkover survey of the proposed Nutberry Wind Farm development, in 2012, found no previously unknown archaeological remains and it is likely that the Proposed Development site has a low or negligible potential for new archaeological discoveries.

The proposed site access route would make use of the existing forestry and coal haul road network, which is also being used for other local developments within the Hagshaw Cluster.

7.2.2 Outer Study Area (see below (7.4.2) for definition)

Preliminary assessment of the Historic Environment Scotland (HES) designations database shows that there are no historic battlefields and no Inventory Gardens and Designed Landscapes within 10km of the Proposed Development (outermost scoping turbine layout). There are four Conservation Areas within 10km: Douglas, Lesmahagow, Sandford and Strathaven. The New Lanark World Heritage Site (also a Conservation Area and an Inventory Garden and Designed Landscape) lies 12km to the northeast of the Proposed Development site.

The initial assessment shows that there are ten Scheduled Monuments within 10km of the Proposed Development (outermost scoping turbine layout); only one of which (Glenbuck Ironworks, 470m NW of Glenbuck Home Farm (SM2931)) is within 5km of the Proposed Development.

The initial assessment shows that there are two Category A Listed Buildings within 10km of the Proposed Development (outermost scoping turbine layout): Douglas Village Earl of Angus' Monument (LB1457); and St Bride's Chapel, including choir and memorial stones in churchyard, excluding scheduled monument SM90265, boundary walls and gate posts, Douglas (LB1490). In addition, there are numerous listed buildings of categories b and C within 10km but only two Category B Listed Buildings (Auchengilloch Monument (LB1279) and Auchlochan Bridge (LB7688)) and one Category C Listed Building (Covenanters' Monument, Priesthill (LB14395)) within 5km of the Proposed Development.

7.3 Relevant Guidance and Legislation

The assessment will be prepared following the advice and guidance in the following documents:

7.3.1 Legislation

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas (Scotland) Act 1997 (as amended by Historic Environment (Amendment) (Scotland) Act 2011);
- Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013; and,
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

7.3.2 Planning Policies

- National Planning Framework (NPF 3);
- Scottish Planning Policy (SPP) (2014);
- Historic Environment Policy for Scotland (HEPS) (2019) (HES 2019); and

7.3.3 Guidance

- SNH and Historic Environment Scotland (2018) 'Environmental Impact Assessment Handbook';
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014);
- Designation Policy and Selection Guidance (Historic Environment Scotland, 2019);
- Managing Change in the Historic Environment: Setting (Historic Environment Scotland, 2016); and,
- Planning Advice Note 2/2011: Planning and Archaeology (PAN 2/2011).

7.4 Proposed Scope of Assessment

The EIA Report will include a chapter that will present an assessment of the Proposed Development's potential effects upon archaeology and cultural heritage assets. The assessment will consider the potential for direct (i.e. physical) effects on the cultural heritage within the Proposed Development site, arising from construction activities, and effects upon the settings of heritage assets with statutory and non-statutory designations in the wider landscape surrounding the Proposed Development. Cultural heritage assets within 10km of the site are shown on Figure 7.1.

7.4.1 Study Areas

Two study areas will be used for the assessment as shown in Figure 7.1:

- The Inner Study Area: the Proposed Development site, defined by the site red line boundary, within which turbines and associated infrastructure are proposed, will form the study area for the identification of heritage assets that could receive direct effects arising from the construction of the Proposed Development.
- The Outer Study Area: a wider study area extending 10km from the outermost finalised proposed turbine locations will be used for the identification of cultural heritage assets whose settings may be affected by the Proposed Development (including cumulative effects). Views towards any assets identified as having settings sensitive to change will also be considered, even where no visibility is predicted from the asset. The wider ZTV will also be assessed to identify any designated assets beyond 10km that have settings that may be especially sensitive to the Proposed Development.

7.4.2 Issues Scoped Out of the Assessment

In order to provide a proportionate EIA that focuses on the likely significant effects on archaeology and cultural heritage arising from the Proposed Development it is proposed that the following will be scoped out:

- Impacts on the settings of heritage assets beyond 10km of the Proposed Development will be scoped out, as most assets beyond that distance will be too far distant to have their settings significantly adversely affected by the Proposed Development. New Lanark World Heritage Site, 12km northeast of the Proposed Development, will be considered in the design stage and addressed in the assessment.
- Assessment of impacts on the settings of Category C Listed Buildings beyond 5km will be scoped out as it is considered that, for these locally important designations, beyond that distance their settings will not be significantly adversely affected. Most of the Category C Listed Buildings within the Outer Study Area lie within built up areas in Douglas to the southeast and Strathaven, to the northwest.
- Assessment of impacts on heritage along the proposed site access route (from M74 Junction 11) to the proposed wind farm boundary. This proposed access route utilises a route already in use as existing coal and timber haul roads and used for other local developments within the Hagshaw Cluster, therefore no addition impacts are likely to arise in connection with the Proposed Development.

7.4.3 Post-scoping Consultation

Following receipts of scoping opinions, consultation will be carried out where necessary to clarify and resolve any points raised through the scoping process, and to agree locations for (and types of) any requested visualisations. Potential receptors for visualisations (photomontages or wirelines) will be identified by the heritage consultants through analysis of the blade and tip height ZTVs and presented to HES and WoSAS for their agreement.

7.4.4 Desk-based Assessment

A detailed desk-based assessment will be carried out, drawing on existing archive records (South Lanarkshire Historic Environment Record, curated by West of Scotland Archaeology Service (WoSAS)), historic maps, and modern high-resolution aerial photography (Ordnance Survey MasterMap Imagery) to identify sites and areas that have archaeological and historic environment potential. The following sources will be consulted:

- Historic Environment Scotland (HES) Spatial Data Warehouse: for up-to-date data on the locations and extents of Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory status Garden and Designed Landscapes and Inventory status Historic Battlefields;
- WoSAS Historic Environment Record (HER): for a digital database extract in GIS for all assets within 10km of the Proposed Development site boundary;
- The National Record for the Historic Environment (NRHE) database (Canmore): for any information additional to that contained in the HER;
- Bibliographic references (e.g. Statistical Accounts of Scotland; any references in HER or NHRE entries) will be consulted to provide background and historic information;
- Map Library of the National Library of Scotland: for Ordnance Survey maps and other historical map resources; and
- Historic Land-Use Assessment Data for Scotland (HLAMap): for information on the historic land use character of the Proposed Development site and the surrounding area.

7.4.5 Field Surveys

It is proposed that no field survey of the Proposed Development site will be carried out. The Proposed Development lies entirely within commercial forestry plantation and the proposed access route utilises a route already in use as existing coal and timber haul roads and used for other local developments within the Hagshaw Cluster. The only heritage assets identified by the desk-based study lie within current forestry

coupes, within watercourse buffers and well clear of any likely development infrastructure. All of the known features can be avoided through design mitigation (see below 7.6.1)

Site visits to heritage assets in the Outer Study Area will be undertaken to assess, with the aid of wireline visualisations, the predicted impact of the Proposed Development on their settings. Site visits will include any assets specifically identified by consultees as requiring assessment and those identified through analysis of the blade tip height ZTV where it is considered, on the basis of professional judgement, that the impact on their settings could be significant.

7.4.6 Assessment Methodology

The effects of the Proposed Development on heritage assets will be assessed on the basis of their type (direct effects, impacts on setting and cumulative impacts) and nature (adverse or beneficial). The assessment will take into account the value/sensitivity of the heritage asset and its setting and the magnitude of the predicted impact, following the approach advised in the SNH/HES (2018) EIA Guidance.

- Adverse impacts are those that detract from or reduce cultural significance or special interest of heritage assets.
- Beneficial impacts are those that preserve, enhance or better reveal the cultural significance or special interest of heritage assets.

The assessment of significance of effects will be undertaken using two key criteria: the sensitivity of the cultural heritage asset and the magnitude of the predicted impact, which measures the degree of change to the baseline condition of an asset resulting from the Proposed Development.

7.4.6.1 Assigning Sensitivity to Heritage Assets

Cultural heritage assets are given weight through the designation process. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies (HES, 2019).

Table 7.1 summarises the relative sensitivity of key cultural heritage assets (and their settings) relevant to the Proposed Development (excluding, in this instance, Marine Resources).

Table 7.1: Sensitivity of Heritage Assets

Sensitivity of Heritage Asset	Definition/Criteria
High	Assets valued at an international or national level, including: ➢ World Heritage Sites ➢ Scheduled Monuments ➢ Category A Listed Buildings (Buildings of special architectural or historic interest which are outstanding examples of a particular period, style or building type) ➢ Inventory Gardens and Designed Landscapes ➢ Inventory Historic Battlefields ➢ Non-designated assets that meet the relevant criteria for designation
Medium	Assets valued at a regional level, including: ➢ Archaeological sites and areas that have regional value (contributing to the aims of regional research frameworks)

Sensitivity of Heritage Asset	Definition/Criteria
	➢ Category B Listed Buildings (Buildings of special architectural or historic interest which are major examples of a particular period, style or building type) ➢ Conservation Areas
Low	Assets valued at a local level, including: ➢ Archaeological sites that have local heritage value ➢ Category C listed buildings (Buildings of special architectural or historic interest which are representative examples of a period, style or building type) ➢ Unlisted historic buildings and townscapes with local (vernacular) characteristics
Negligible	Assets of little or no intrinsic heritage value, including: ➢ Artefact find-spots (where the artefacts are no longer in situ and where their provenance is uncertain) ➢ Poorly preserved examples of particular types of features (e.g. quarries and gravel pits, dilapidated sheepfolds, etc)

7.4.6.2 Criteria for Assessing the Magnitude of Impact

The magnitude of impact (adverse or beneficial) will be assessed in the categories, high, medium, low and negligible and described in Table 7.2.

Table 7.2: Magnitude of Impact

Magnitude of Impact	Criteria	
	Adverse	Beneficial
High	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of the asset's cultural significance. Changes that substantially detract from how a heritage asset is understood, appreciated and experienced	Preservation of a heritage asset in situ where it would otherwise be completely or almost completely lost. Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated and experienced.
Medium	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is appreciably altered. Changes that appreciably detract from how a heritage asset is understood, appreciated and experienced.	Changes to important elements of a heritage asset's fabric or setting, resulting in its cultural significance being preserved (where this would otherwise be lost) or restored. Changes that improve the way in which the heritage asset is understood, appreciated and experienced.

Magnitude of Impact	Criteria	
	Adverse	Beneficial
Low	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is slightly altered. Changes that slightly detract from how a heritage asset is understood, appreciated and experienced.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed. Changes that result in a slight improvement in the way a heritage asset is understood, appreciated and experienced.
Negligible	Changes to fabric or setting of a heritage asset that leave its cultural significance unchanged and do not affect how it is understood, appreciated and experienced.	

7.4.6.3 Assessment of Effects on Setting

Historic Environment Scotland's guidance document, 'Managing Change in the Historic Environment: Setting' (HES 2016), notes that:

"Setting can be important to the way in which historic structures or places are understood, appreciated and experienced. It can often be integral to a historic asset's cultural significance."

"Setting often extends beyond the property boundary or 'curtilage' of an individual historic asset into a broader landscape context".

The guidance also advises that:

"If Proposed Development is likely to affect the setting of a key historic asset, an objective written assessment should be prepared by the applicant to inform the decision-making process. The conclusions should take into account the significance of the asset and its setting and attempt to quantify the extent of any impact. The methodology and level of information should be tailored to the circumstances of each case".

The guidance recommends that there are three stages in assessing the impact of a development on the setting of a historic asset or place:

- Stage 1: identify the historic assets that might be affected by the Proposed Development;
- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and
- Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated.

Following this approach, the turbine blade tip and hub height ZTVs for the Proposed Development will be used to identify those heritage assets from which there would be theoretical visibility of one or more of the proposed wind turbines.

- World Heritage Sites, Scheduled Monuments, Non-statutory Register sites (NSRs) identified in HERs, Category A and B Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes and Inventory Historic Battlefields, where present within the blade tip height ZTV and within 10km of the outermost turbines, will be included in the assessment.
- Category C Listed buildings within the blade tip height ZTV and within 5km of the outermost turbines will be included in the assessment.

7.4.6.4 Assessing the Significance of Effects

The sensitivity of the asset (Table 7.1) and the magnitude of the predicted impact (Table 7.2) will be used to inform the professional judgement of the potential significance of the resultant effect. Table 7.3 summarises the criteria for assigning significance of effect. Where two outcomes are possible through application of the matrix and where a potentially significant effect may result, professional judgement supported by reasoned justification, will be employed to determine the level of significance.

Table 7.3: Significance of Effect

Magnitude of Impact	Sensitivity of Asset			
	High	Medium	Low	Negligible
High	major	major / moderate	moderate / minor	minor
Medium	major / moderate	moderate	minor	minor / negligible
Low	moderate / minor	minor	minor / negligible	minor / negligible
Negligible	minor	minor / Negligible	minor / negligible	negligible

Major and moderate effects are considered to be 'significant' in the context of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations). Minor and negligible effects are considered to be 'not significant'.

7.5 Potential Impacts

Potential significant effects would include:

- Impacts (including cumulative impacts) on the settings of designated heritage assets in the Outer Study Area. A list of proposed visualisation viewpoints will be agreed with consultees (HES and WoSAS) through post-scoping consultation.

Based on an initial assessment of the current land-use (commercial forestry plantation) and the identified baseline within the Proposed Development site (Section 7.2.1 above), it is considered that there is a low potential for any significant direct effect on cultural heritage assets to arise from construction work.

7.6 Potential Mitigation

7.6.1 Design mitigation

- Avoidance of identified areas of constraint during the design of the turbine layout and the onsite infrastructure; and
- Avoidance, or minimisation, of visual impact on New Lanark WHS.

7.6.2 Construction Phase mitigation

- Fencing off/marking out areas of constraint for avoidance during the construction phase;
- Archaeological evaluations or set piece excavations where heritage assets cannot be avoided; and
- Watching briefs/archaeological monitoring in archaeologically

8. Hydrology, Hydrogeology and Geology

8.1 Introduction

This section considers the potential for significant effects on surface water, groundwater, the potential risk of flooding, and the drainage requirements which may result from the Proposed Development. This section also considers the potential effects associated with the ground conditions, including, geological resources, and the ground stability of the site and the surrounding area.

8.2 Baseline Description

8.2.1 Hydrology

8.2.1.1 Site Description

The site comprises commercial forestry plantation. There are five main watercourses within the site boundary, the River Nethan transecting the site from the south west to the north east, the Birkenhead Burn along the northern boundary of the site, the Eaglin Burn in the centre of the site draining south to the River Nethan, and the Logan Water and Long Burn in the west of the site draining north to the Logan Reservoir. Other unnamed tributaries of the Logan Water to the west of the site extend into the western edges, along with unnamed tributaries of the River Nethan to the south and the Birkenhead Burn to the north. The Logan Water, River Nethan and Birkenhead Burn all flow generally south west to North east before joining to the east of the site.

There are a number of small drainage channels and minor tributaries of the noted watercourses within the site area.

8.2.1.2 Drainage Catchments

The site drains directly into the River Nethan, Logan Water and Birkenhead Burn. The River Nethan water was classified by Scottish Environment Protection Agency (SEPA) in 2018 as Moderate quality, and the Logan Water was classified by SEPA as Good in 2018.

8.2.1.3 Groundwater

Groundwater beneath the site is situated within North Glengavel bedrock. The aquifer is classified as localised sand and gravel and was given an overall status of 'Good with High Confidence' by SEPA in2018.

8.2.1.4 Private Water Supplies

No wells or springs have been identified at the site or in the immediate vicinity, based on a review of mapping. However, SLC will be consulted for up to date records on any Private Water Supplies within 500 m of any proposed infrastructure.

8.2.1.5 Flooding

A review of SEPA's 'Indicative River & Coastal Flood Map' has revealed no areas of the Proposed Development site which are at risk from river and coastal flooding, and only small isolated patches and linear zones following burns are at risk from surface water flooding.

8.2.1.6 Geology

Designated Sites

The Muirkirk Uplands SSSI forms the western boundary of the site. A small section of the SSSI is also located within the northern boundary along the route of the Birkenhead Burn. A Geological Conservation Review (GCR) site is also noted. Both the SSSI and GCR are designated for their geological interest. As both sites are

either out with the immediate site or out with any proposed works, they will not be not affected by the Proposed Development.

Solid and Superficial Geology

Bedrock across the site mainly comprises the Patrick Burn Formation (alternating beds of medium grained sandstone and siltstone). There are two faults running south west to north east through the site, with the Ponesk Burn Formation (medium grained sandstone) and South of Scotland Granitic Suite (felsite) both to the south east of the lower fault. To the north east of the site a further fault separates the Patrick Burn Formation from, in turn, the Blaeberry Formation (mudstone), Dunside Formation (micaceous fine grained sandstone with mudstone), Leaze Formation (fine grained sandstones interbedded with silty mudstones), Birkenhead Sandstone and the Dippal Burn Formation (shaley mudstone overlain by sandstones and siltstones). There are also numerous faults in this area.

Areas of open cast coal workings exist to the east and south of the site. However, it is considered that the site remains unaffected by any surface or underground coal workings.

A review of the geological mapping indicates that the superficial deposits across the site mainly comprise peat with some areas of alluvial deposits associated with rivers and burns. Glacial till is more prominent to the north east of the site.

8.3 Key issues for Consideration in the EIA

8.3.1 Surface water

Management of surface water runoff will need to be considered to ensure that discharge rates to the natural surface water network are regulated to a level appropriate to the receiving system.

The quality of any discharge will need to be given consideration to ensure that the receiving water network is not adversely affected by runoff from the site.

The assessment will consider the risk of pollution of watercourses during the construction phase.

8.3.2 Groundwater

The entire area of groundwater encompassed by the Proposed Development site boundary is classified as good. The EIA will consider the risk to underlying groundwater from the construction and operation of the Proposed Development and provide appropriate mitigation where necessary.

8.3.3 Water Resources

New drainage systems will be designed, as required, to ensure that any discharges are appropriately treated prior to outflow into surface waters.

8.3.4 Geology

The site is indicated on geology maps to be underlain by superficial deposits mainly comprising peat with some areas of alluvial deposits associated with rivers and burns. Glacial till is more prominent to the north east of the site. A peat probing exercise will be undertaken to establish the presence and depth of peat.

8.4 Proposed Scope of Assessment

8.4.1 Desk-Based Assessment

A desk-based assessment will be carried out in order to establish the catchment characteristics and baseline geological and hydrogeological conditions beneath the site.

The desk-based review of baseline information will comprise:

- The determination of site geology and hydrogeology from maps published by the BGS, mine abandonment plans and site investigation reports (where available), including identifying any areas of potential deep peat;
- A review of existing sources of data relating to the water regime, including SEPA water quality and flood risk data, Institute of Hydrology hydrometric statistics, discharge consents, abstraction licenses and identification of other water users;
- The identification and gathering of information concerning any geologically important sites;
- A review of Private Water Supplies in the area and a risk assessment where necessary; and
- Consideration of the findings of site investigative reports (where available), historical site uses, industrial land use and permits, areas of determined or potential Contaminated Land, soil type and permeability, and contamination status of the site and surrounding area, in order to determine the existing groundwater quality and regime.
- A review of the development proposals and reports from other technical studies being undertaken, including ecology surveys which may identify areas of GWDTE.

Consultation will be carried out with key organisations including SNH, SEPA and SLC.

8.4.2 Site-Based Assessment

A site survey will be undertaken across the site. This will include a visual survey of watercourses and waterbodies to record key features and characteristics, including, if applicable, potential locations where watercourses will require to be crossed.

As noted above, where deemed necessary based on desk study, preliminary site walkover(s) and ecology survey findings, peat probing will be undertaken to identify and map peat depth and distribution, and (if appropriate) collect peat samples for laboratory testing. Findings from peat survey work will feed into design iteration.

8.4.3 Assessment of Effects and Mitigation

Following the assessment of effects, required mitigation measures will be identified and any subsequent residual effects will be assessed. Specific reference will be made to the SEPA Guidance Note 4 'Planning guidance on wind farm developments' (LUPS-GU4) (2012b) and SEPA 'Guidelines for Water Pollution Prevention from Civil Engineering Contracts' and 'Special Requirements' (2006).

9. Carbon Calculator

A requirement of the Section 36 application is for developers to complete the online Carbon Calculator tool. The tool assesses the carbon impact of the Proposed Development by comparing the carbon costs of the wind farm with the carbon savings attributed to the scheme. This generates a carbon payback time for the wind farm to become carbon neutral.

An initial carbon balance of the site will be calculated taking account of issues involving any potential peat removal, embedded carbon in wind farm components, and transport, coupled with estimated carbon savings delivered by the renewable electricity generated over the lifetime of the development.

The online carbon calculator assessment will then be completed utilising all information from the carbon balance calculations and the results of the onsite peat probing exercise.

10. Traffic and Transport

10.1 Introduction

The Traffic and Transport chapter will assess the effects arising from the Proposed Development with respect to the construction and operation of the development, as described in Chapter 2 'The Proposed Development'.

It will consider all vehicle movements associated with the construction and operation of the Proposed Development, including consideration of construction traffic and the source of and vehicle movements associated with the delivery (and export, if required) of material and components to the site. The operational phase is likely to have little traffic impact as the Proposed Development will be visited by only the occasional maintenance and inspection vehicle. The decommissioning phase is too far in the future to be considered at present and will therefore not be included in the assessment.

10.2 Baseline Description

The baseline will be informed by site visits and collection of data. The transport network around the Proposed Development will be visited and any potentially sensitive receptors will be identified. Data on traffic flows and accidents will be obtained for the roads likely to experience an increase in traffic arising from the Proposed Development.

A traffic survey counts are not possible due to the current COVID-19 circumstances traffic count data will be taken from the recent applications for Douglas West Extension and Hagshaw Hill Repowering schemes.

10.3 Relevant Guidance and Legislation

The methodology will principally follow the '*Guidelines for the Environmental Impact of Road Traffic*' (2014) prepared by the Institute of Environmental Assessment.

The impact of the traffic estimated to be generated by the Proposed Development on the surrounding local road network will be subject to a screening process using the following two rules outlined in the Guidelines to identify the appropriate extent of the assessment area:

1. Rule 1 - include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%).
2. Rule 2 - Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

The assessment of the baseline situation will determine which sections of road should be subject to which of the above rules. Where the predicted increase in traffic flows is lower than the appropriate thresholds, the Guidelines suggest the significance of effects can be stated to be low or insignificant and further detailed assessments are not warranted.

10.4 Proposed Scope of Assessment

The geographical scope of the assessment will be those sections of the road network likely to experience increases in traffic arising from the Proposed Development more than the appropriate threshold from the two rules above. It is anticipated that the geographic al scope of assessment will cover the slip roads to and from the M74 at Junction 11 and the section of the B7078 linking the two slip roads.

10.5 Potential Impacts

Where the estimated increase in traffic flows is expected to be greater than the appropriate rule above, the potential impacts on the following topics will be considered in more detail:

3. Severance;
4. Driver delay;
5. Pedestrian delay;
6. Pedestrian amenity;
7. Fear and intimidation; and
8. Accidents.

The potential for cumulative effects from other relevant developments in the study area will also be considered.

10.6 Potential Mitigation

Potential mitigation measures will be identified once the impacts have been assessed. These measures may include restrictions on vehicles routeings and times in order to avoid or reduce impacts on sensitive receptors.

11. Socio-Economics, Recreation and Tourism

11.1 Introduction

The socio-economic and tourism assessment will include consideration of existing land uses of the site, local tourism activity, employment generation and any indirect economic effects from the development.

11.2 Baseline Description

The assessment will include a description of the current socio-economic baseline with the local area. This will include a summary of economic performance data for each study area and a description of the relevant tourism assets that will be covered in the assessment.

The baseline environment will cover and compare three study areas:

- Local Area, comprising of electoral wards that cover the location of the development and nearest settlements;
- South Lanarkshire; and
- Scotland.

The economic impacts will be quantified for South Lanarkshire Council (SLC) Area and Scotland as whole.

The socio-economic baseline will cover:

- the demographic and economic profile of the local area within the context of the regional and national demographic trends, including employment and economic activity;
- the industrial structure of the local area within the context of regional and national economies;
- the role of the tourism sector in the local and regional economy; and

- wage levels within the regional economy compared to the national level.

11.3 Relevant Guidance and Legislation

There is no specific legislation or guidance available on the methods that should be used to assess the socio-economic impacts of a proposed onshore wind farm development. The proposed method has however been based on established best practice, including the used in UK Government and industry reports on the sector. In particular this assessment will draw from two studies by BiGGAR Economics on the UK onshore wind energy sector, a report published by RenewableUK and the Department for Energy and Climate Change (DECC) in 2012 on the direct and wider economic benefits of the onshore wind sector to the UK economy (BiGGAR Economics, 2012) and a subsequent update to this report published by RenewableUK in 2015 (BiGGAR Economics, 2015).

There is also no formal legislation or guidance on the methods that should be sued to assess the effects that wind farm development may have on tourism and recreation interests. The proposed method would consider individual attractions and tourism facilities to assess if there could be any effects from the development.

It is also important that the socio-economic and tourism chapter takes account of the relevant local and national policy objectives. The most relevant are expected to include national and local economic and tourism strategies.

11.4 Proposed Scope of Assessment

It is anticipated that the contents of the assessment chapter will include:

- introduction, including scope of assessment and methodology;
- economic development and tourism strategic context;
- baseline socio-economic and tourism context;
- socio-economic assessment;
- tourism impact assessment;
- proposed measures and actions to maximise local economic and community impacts;
- proposed measures and actions to mitigate any harmful effects (if required); and
- summary of findings and conclusion.

This will be a desk-based study and therefore there will be no stakeholder consultations undertaken as part of this study.

11.5 Potential Impacts

The issues that will be considered in this assessment will include the potential socio-economic and tourism effects associated with the development.

An economic impact analysis will be undertaken using the methodology developed by BiGGAR Economics, which has been used to assess over 100 onshore wind farms across the UK. The potential socio-economic effects will be considered here:

- temporary effects on the regional and/or national economy due to expenditure during the construction phase;
- permanent effects on the regional and/or national economy due to expenditure associated with the ongoing operation and maintenance of the development;

- permanent effects as a result of any additional public expenditure that could be supported by the additional tax revenue that would be generated by the development during the operational phase; and
- permanent effects on the local economy that could be supported by any community funding proposals during the operational phase of the development.

The link between onshore wind energy developments and the tourism sector has been a subject of debate. However, the most recent research has not found a link between tourism employment, visitor numbers and onshore wind development. For example, in 2017 BiGGAR Economic published an updated study that considered 28 wind farms constructed between 2009 and 2015 and the trends in tourism employment in the areas local to these development. The analysis found that there was no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at the local authority level nor in the areas immediately surrounding wind farm developments.

Nevertheless, the tourism sector is an important contributor to the Scottish economy and so there is merit in considering whether the development will have any effect on the tourism sector. This assessment will consider the potential effects that the development could have on tourism attractions, routes, trail and local accommodation provider. This will consider the implications of any effects identified for the tourism sector in the local area and wider region.

11.6 Potential Mitigation

During construction, measures will be adopted to ensure that local companies are invited to tender for elements of the project. The socio-economic and tourism assessment will consider ways by which expenditure resulting from the scheme and flowing from any community funding proposals can be optimised to generate the maximum benefits for the local economy and community.

12. Aviation, Radar and Telecommunications

12.1 Introduction

This section considers potential issues associated with aviation, radar and telecommunications as a result of the Proposed Development during the construction, operation and decommissioning phases.

12.2 Baseline Description

The Proposed Development lies underneath the Scottish Terminal Area, 38km from Prestwick Airport and 40km from Glasgow Airport.

There are no military radars with potential to be affected by the Proposed Development. The Proposed Development lies within a low priority, military low flying area.

12.3 Relevant Guidance and Legislation

The primary planning policy document is the Scottish Planning Policy document (the SPP), which states a requirement to assess impacts on aviation, other defence matters and seismological recording.

Civil Aviation Authority (CAA) guidance, within CAP 764 (CAA Policy and Guidance on Wind Turbines), sets out recommended consultation and assessment criteria for the impacts of wind turbines on all aspects of civil aviation.

Civil Aviation Authority (CAA) CAP 393, The Air Navigation Order and Regulations, specifies the statutory requirements for the lighting of onshore wind turbines over 150 m tall.

Planning Circular 2/03, Safeguarding of Aerodromes, Technical Sites and Military Explosives Storage Areas, contains annexes which describe the formal process by which planning authorities should take into account safeguarding, including in relation to wind energy developments.

12.4 Proposed Scope of Assessment

12.4.1 Aviation

An initial review has indicated manageable impacts to radars operated by Glasgow Airport and NATS En-route. Formal consultations will be undertaken with Glasgow Airport, NATS En-route and also Prestwick Airport to confirm their position and, if required, identify any required mitigation for effects on aviation and radar infrastructure. No other stakeholders own or operate infrastructure with the potential for impacts. The MoD do not provide a meaningful pre-submission consultation service and will respond directly to the Scottish Government.

12.4.2 Telecommunications

Any potential effects on communication links will be sought through formal consultation with Spectrum Licensing (previously known as Ofcom) and all relevant link operators. Where possible and applicable, the turbines will be designed to take into account the minimum separation distance from identified communication link(s). An assessment will be made as to the significance of potential operational effects and where appropriate, suitable mitigation measures will be discussed.

12.4.3 Television

The closest television transmitters are the Glespin and Muirkirk transmitters. The Muirkirk Transmitter is located approximately 6 km south-south west of the site, and the Glespin Transmitter is located approximately 8 km east-south east of the site. These transmitters have switched to digital transmission only. Currently there is no widely accepted method of determining the potential effects of wind turbines on digital television reception, however digital television signals are better at coping with signal reflections, and do not suffer from ghosting that may occur with analogue signals.

To date, there are very few cases of wind turbine interference with digital television reception post-digital switchover. Given the strength of the digital signal in the area and the inherently resilient nature of digital television reception, there is considered to be a low risk of any interference from a wind energy development at this location on domestic television reception.

Due to the low risk of interference with television reception, the requirement to address any reception issues once the Proposed Development is operational could be conditioned in any consent granted. For the above reasons, it is not proposed to carry out a detailed assessment of potential effects on television reception and this topic therefore will be scoped out of further assessment.

12.5 Potential Impacts

12.5.1 Aviation

The Proposed Development is predicted to have impacts on the Glasgow Airport primary radar, requiring mitigation to allow the normal operation of the airport.

The Proposed Development is also expected to have impacts on the NATS En-route radars at Lowther Hill and Cumbernauld, requiring mitigation to allow normal operation.

12.6 Potential Mitigation

12.6.1 Aviation

Mitigation is available to remove the impacts of the Proposed Development on both Glasgow Airport and NATS En-route. This is mitigation that has been put in place to mitigate the impacts of other nearby wind farms. The mitigation will be agreed through direct dialogue between the applicant and these two stakeholders, with studies commissioned as necessary to fully quantify and confirm the acceptability of the mitigation.

13. Shadow Flicker

13.1 Baseline Description

This section considers shadow flicker, an effect caused by the rotation of the turbine blades when the sun is shining, which can create a flickering or strobe like effect. It can be distracting and disturbing for people who are affected. Effects occur usually when the frequency of the flicker is less than 1.5 Hz.

13.2 Relevant Guidance and Legislation

There are at present no formal guidelines available on what exposure would be acceptable in relation to shadow flicker. There is no standard for the assessment of shadow flicker. The specific advice sheet from Scottish Government, Onshore Wind Turbines, a web-based guide (Scottish Government, 2014) sets out the potential geographic area which may fall under assessment: *"Where this (shadow flicker) could be a problem, developers should provide calculations to quantify effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule ten rotor diameters), 'shadow flicker' should not be a problem."*

Published research by the Department of Energy and Climate Change (DECC), Update of UK Shadow Flicker Evidence Base (DECC, un-dated), evaluates the current international understanding of shadow flicker and confirms an acceptable study area for assessment is ten rotor diameters from each turbine and within 130 degrees either side of north.

13.3 Methodology

Based on an indicative candidate turbine model (maximum tip height 200 m), which has a rotor diameter of maximum 155 m, the minimum distance from the turbine at which residential property must lie in order to be out with consideration for shadow flicker effects, is 1.55 km (ten times the rotor diameter).

16 properties have been identified within 1.55 km of the proposed turbines.

The shadow flicker assessment will be undertaken using WindPRO computer modelling software and will be run for both a worst case scenario (accounting for 365 sunshine days per year and 100 % turbine operation) and realistic scenario (using, where possible, measured meteorological data and 85 % turbine operation) on the potential shadow flicker occurrence for a 1 m x 1 m ground floor window at each identified sensitive receptor location, assumed to be facing directly towards the Proposed Development.

The sensitivity of the receptors will be considered to be high unless there are particular reasons for reduced sensitivity. A significant effect will be noted where a receptor is identified as experiencing greater than 30 hours of flicker a year or more than 30 minutes per day on the worst affected day (based on the realistic scenario), which ever if greater (DECC, 2011).

The assessment will present clear findings on the estimated number of hours of shadow flicker impact anticipated for each receptor, for both scenarios. Where required, potential mitigation measures will be discussed.

14. Forestry

14.1 Introduction

Cumberhead Forest is a large commercial forest extending to 2,019.78ha and was originally planted in phases between 1974 and 1989, predominantly with Sitka spruce with minor components of other commercial species including Lodgepole pine and Japanese larch. The property is managed as a commercial forest, with felling and replanting having taken place under an FCS and UKWAS approved Forest Plan since 2006, which has seen the progressive restructuring of the forest's age and species composition.

14.2 Baseline Description

Cumberhead Forest is held in a single ownership and managed as a commercial forest with felling and replanting delivered in accordance with an approved long-term forest plan, most recently renewed in 2016. Through the forest plan, the forest is being progressively harvested and replanted, retaining a strong focus on commercial timber production but reflecting modern forestry practices through the introduction of designed open ground and a greater diversity of conifer and native woodland species.

As part of the restructuring progress, Cumberhead has successfully integrated an operational windfarm, Nutberry Hill, into the centre of the forest, with six turbines key-holed into the crop, a further eleven turbines are consented as part of Cumberhead Wind Farm and another thirteen turbines are proposed to be key-holed as part of the proposed Douglas West Extension. The Proposed Development includes 932ha of Cumberhead Forest, with 20 turbines proposed to be key-holed into the western-most section of forest. This section of forest is known as Todlaws and is characterised by young recently felled and replanted ground and areas of Sitka spruce crops approaching maturity planted between 1976 and 1979. Restructuring has commenced in this area of the forest with approximately 280ha of harvesting and replanting having taken place between 2008 and 2020.

14.3 Relevant Guidance and Legislation

All forestry proposals will be subject to the UK Forestry Standard and associated suite of best practice guidance, with the following policies and guidance being referred to as part of the forestry assessment:

- Scottish Forestry Strategy (SFS), 2019;
- Scottish Land Use Strategy (SLUS), 2016;
- Scottish Planning Policy 2014 (SPP);
- National Planning Framework for Scotland 3 (NPF3), 2014;
- Control of Woodland Removal (CoWR), 2019;
- Supplementary Guidance to support the FC Forests and Peatland Habitat Guidance Note (2000);
- Management of Forestry Waste, 2017;
- Use of Trees Cleared to Facilitate Development on Afforested Land – Joint Position Statement and Guidance, 2014;
- South Lanarkshire Strategic Development Plan and Local Plan, 2015; and
- Glasgow and Clyde Valley Forestry and Woodland Strategy, 2011.

In line with these policies and guidance, the overarching objective will be to minimise the scale of impact on the forest environment, consulting with Scottish Forestry, and other consultees as necessary, on appropriate forestry proposals.

14.4 Proposed Scope of Assessment

The assessment methodology sets out in the Scottish Government's policy on control of woodland removal: implementation guidance will form the basis of the approach to be adopted, while drawing on the principals set out in The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 in assessing the overall significance of environmental effects.

This will involve a detailed approach to forestry and windfarm planning being undertaken to assess the impacts of the Proposed Development, through an iterative design process in consultation with Scottish Forestry. This process will require the production of specific forestry proposals detailing areas to be harvested, timber production and replanting plans associated with the Proposed Development. These windfarm forestry plans will then be compared to the existing, approved Forest Plan as a benchmark against which the impacts of the Proposed Development can be quantitatively assessed and the area of woodland removal quantified.

In-line with established best practice, the assessment will seek to minimise the area of forestry included in the application, constraining the application to those areas of forestry directly required for the application, retaining the wider forestry resource under the authority of Scottish Forestry. This approach not only helps to minimise woodland impacts but also the production of non-forestry residues, which will also be considered as part of the assessment.

Areas of woodland removal arising as a result of the Proposed Development will be identified, quantified and detailed as part of this assessment along with details of how any arising compensatory planting will be addressed.

14.5 Potential Impacts

Potential impacts include changes to the forest design through premature harvesting of timber, with associated impacts on age structure, coupe design and timber production. Woodland removal will also arise as a result of essential infrastructure footprints and associated tree free buffer zones located on forest ground.

14.6 Potential Mitigation

Mitigation will include the development of revised forestry proposals in consultation with Scottish Forestry which will form part of the final submission. These plans would seek to minimise the forestry related impacts and keep the areas of forestry subject to the final submission limited to those areas essential to the Proposed Development, with the wider forest management remaining under the authority of Scottish Forestry. Areas of forestry lost to essential windfarm infrastructure footprints and associated tree free buffer zones will be subject to full Compensatory Planting Obligations, which will be included in the final submission along with a full Compensatory Planting Plan detailing how this obligation will be secured and delivered.

15. Summary

This Scoping Report outlines the proposed technical and environmental assessment that will be included within the EIA Report, to be submitted alongside the Section 36 application for the Proposed Development. The proposed scope and methodologies for each assessment have been provided and the guidance to be followed set out. Should any further information be required in order that a full Scoping Opinion can be provided we would be happy to provide further information and/or discuss any further requirements.

Appendices

APPENDIX 4.1 - VISIBLE TURBINE LIGHTING ASSESSMENT: CRITERIA AND METHODOLOGY

1. The primary source of best practice for Landscape and Visual Impact Assessment (LVIA) in the UK is *'The Guidelines for Landscape and Visual Impact Assessment', 3rd Edition (GLVIA3) (Landscape Institute and the Institute for Environmental Management and Assessment, 2013)*. The assessment criteria to inform the assessment of effects of visible turbine lighting has been developed in accordance with the principles established in this best practice document. It should however be acknowledged that GLVIA3 establishes guidelines not a specific methodology. The preface to GLVIA3 states:

   'This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand.'

2. The assessment criteria set out below have therefore been developed specifically for this appraisal to ensure that the methodology is fit for purpose.

3. The purpose of an LVIA when undertaken in the context of an Environmental Impact Assessment (EIA) is to identify any likely significant landscape and visual effects arising as a result of the proposals upon the receiving environment. An LVIA should consider both:

   - ***effects on the landscape as a resource in its own right (the landscape effects); and***
   - ***effects on specific views and visual amenity more generally (the visual effects).***

4. It is recognised that in some circumstances, it may be possible for turbine lighting to result in a significant effect on the character of the surrounding landscape. For example, if the proposed wind energy development is located within or in close proximity to a designated dark sky area, or is remote from existing sources of visible lighting, such as residential areas, commercial or industrial sites, or major roads.

5. For wind energy developments which are not located in such areas, it is considered that there would be no potential for significant effects on landscape character to arise from visible turbine lighting of the type proposed. This is because in these areas the character of the landscape during low natural light levels is already in part characterised by the presence of artificial lighting. Therefore, the addition of visible turbine lighting would not have the potential bring about a fundamental change to the characteristics of the landscape.

6. The proposed wind farm lies away from recognised dark sky areas, within a surrounding landscape context which contains some existing sources of artificial light, particularly within surrounding settlements, industrial developments and along highways. However, it is understood that an assessment of the potential for significant effects on landscape character should be undertaken, due to the location of the site itself within an area which is less characterised by the presence of visible light. Therefore, criteria are set out below for the assessment of both landscape character and visual effects.

7. For a daytime assessment, one assesses the worst case situation (i.e. clear full visibility as if a perfect day). A daytime assessment can therefore describe the full extent of that clear visibility, or lack of it, as a moment in time. For this study, it is not just the reverse. What is required is an understanding of low light level conditions which seeks to cover all the periods, both evening; dawn; gloomy winters day and after dark, in which the lights will to some degree be visible. This also seeks to cover the period just after it begins to get dark; the period just before it actually gets dark; the period in the middle as it moves from one to the other and the time after it is dark but a moonlit night affords some view of the landscape.

8. If one described a situation in detail, (e.g. just before sunset with the setting sun still illuminating part of the landscape; part going into deep shadow; a ridgeline in silhouette; the mid-ground in semi-darkness and a partially lit foreground because the street lights had just come on) this would be a snapshot in time

for that viewpoint. Half an hour earlier in would have been different, as it would half an hour later, or at dawn, and that is before the matter of how it would have looked on another day earlier or later in the year is considered. Whether the description was looking east at sunset, or east at dawn would also radically change the description of what was seen and its impact. The report shall try to capture a single assessment that represents a typical judgement for the location in low light conditions, but not a specific set of conditions.

9. Such an assessment that was more specific would become very much larger, with the need to visit viewpoints at multiple times and in a range of light conditions, including dawn and dusk, to get the east - west, sunset - sunrise element. This could lead to multiple written descriptions and assessments for each location for both visual amenity and character effects. It is understood that this represents of proportional approach to the production of the low light assessment.

Nature (Sensitivity) of Landscape Character

10. The nature or sensitivity of landscape character reflects its susceptibility to change and any values associated with it. It is essentially an expression of a landscape's ability to accommodate a particular type of change. It varies depending on the physical and perceptual attributes of the landscape including but not necessarily limited to: scale; degree of openness; landform; existing land cover; landscape pattern and complexity; the extent of human influence in the landscape; the degree of remoteness/wildness; perception of change in the landscape; the importance of landmarks or skylines in the landscape; intervisibility with and influence on surrounding areas; condition; rarity and scenic quality of the landscape, and any values placed on the landscape including any designations that may apply. Additionally, for a consideration of landscape character during low light levels, a key further consideration is the extent to which existing artificial light sources are present in the landscape during low natural light levels.

11. In this assessment, the nature or sensitivity of landscape character shall be considered with reference to published landscape character areas/types. Information regarding the key characteristics of these character areas/types shall be extrapolated from relevant published studies. Together with on-site appraisal, an assessment of landscape sensitivity to visible wind turbine aviation lighting shall be undertaken, employing professional judgement.

12. The nature or sensitivity of landscape character shall be described as very high, high, medium, low or very low.

Nature (Sensitivity) of Visual Receptors

13. The nature or sensitivity of a visual receptor group reflects their susceptibility to change and any values associated with the specific view in question. It varies depending on a number of factors such as the occupation of the viewer, their viewing expectations, duration of view and the angle or direction in which they would see the site. Whilst most views are valued by someone, certain viewpoints are particularly highly valued for either their cultural or historical associations and this can increase the sensitivity of the view. The following criteria are provided for guidance only and are not exclusive:

- ***Very Low Sensitivity** – People engaged in industrial and commercial activities, or military activities, who would be unlikely to have any particular expectation of their wider night time view.*
- ***Low Sensitivity** - People at their place of work (e.g. offices); shoppers; users of trunk/major roads and passengers on commercial railway lines (except where these form part of a recognised and promoted scenic route). The primary interest of such receptors would not generally be on the dusk/night time view.*

- ***Medium Sensitivity** - Users of public rights of way and minor roads which do not appear to be used primarily for recreational activities or the specific enjoyment of the landscape; recreational activities not specifically focused on the landscape (e.g. football). Such receptors may have some interest in their dusk/night time view of the wider landscape, but generally their primary concern would be their immediate landscape context;*
- ***High Sensitivity** – Residents at home; users of caravan parks, campsites and 'destination' hotels; tourist attractions open after daylight hours with opportunities for views of the landscape (but not specifically focused on a particular vista); users of public rights of way or minor roads which appear to be used for recreational purposes or the specific enjoyment of the landscape during dusk/night time (often likely to be in close proximity to residential areas).*
- ***Very High Sensitivity** - People at recognised vantage points (often with interpretation boards) which are designed to take in a dusk/ night time view, people at tourist attractions with a focus on a specific view which is available at dusk/ night time, visitors to historic features/estates where the setting is important to an appreciation and understanding of cultural value and can be visited and appreciated during dusk/night time.*

14. It is important to appreciate that it is the visual receptor (i.e. the person) that has a sensitivity and not a property, public right of way or road. Therefore, a large number of people may use a motorway during dusk/ night time, for example, but this does not increase the sensitivity of the receptors using it. Conversely, a residential property may only have one person living in it but this does not reduce the sensitivity of that one receptor.

15. Where judgements are made about the sensitivity of assessment viewpoints, the sensitivity rating provided shall be an evaluation of the sensitivity of the receptor represented by the viewpoint and not a reflection of the number of people who may experience the view.

16. It is also important not to confuse the concept of visual sensitivity with the perception of wind turbines. It is acknowledged that some people consider wind turbines to be unattractive, but many people also enjoy the sight of them. This matter is therefore not a factor when determining sensitivity.

Nature (Magnitude) of effects on Landscape Character

17. The magnitude of effect on landscape character from visible lighting during low light periods is influenced by the resulting alteration to the physical and perceptual characteristics of the landscape. Professional judgement shall be used as appropriate to determine the magnitude using the following criteria as guidance only. In doing so, it is recognised that usually the landscape components in the immediate surroundings, including any visible lighting, have a stronger influence on the sense of landscape character than distant features whilst acknowledging the fact that more distant features can have an influence on landscape character as well.

    - Very Low Magnitude of Change – No notable introduction of new visible lighting into the landscape; resulting in negligible change to the key physical and/or perceptual attributes of the landscape during the low light period.
    - Low Magnitude of Change - Introduction of a minor new extent of visible lighting into the landscape; resulting in a minor alteration to the key physical and/or perceptual attributes of the landscape during the low light period.
    - Medium Magnitude of Change - Introduction of some notable new visible lighting into the landscape; resulting in some notable change to the key physical and/or perceptual attributes of the landscape during the low light period.
    - High Magnitude of Change - Introduction of major new visible lighting into the landscape; resulting in a major change to the key physical and/or perceptual attributes of the landscape during the low light period.

- Very High Magnitude of Change - Introduction of dominant new visible lighting into the landscape; resulting in a profound change to the key physical and/or perceptual attributes of the landscape during the low light period.

Nature (Magnitude) of effects on views and visual amenity

18. Visual effects are caused by the introduction of new elements into the views of a landscape, or the removal of elements from the existing view. In this case the effects would be brought about by the addition of visible lighting.

19. Professional judgement shall be used to determine the magnitude of impacts using the following criteria as guidance only:

- ***Very Low Magnitude of Change - No change or negligible change in views;***
- ***Low Magnitude of Change - Some change in the view that is not prominent but visible to some visual receptors;***
- ***Medium Magnitude of Change - Some change in the view that is clearly notable in the view and forms an easily identifiable component in the view;***
- ***High Magnitude of Change - A major change in the view that is highly prominent and has a strong influence on the overall view.***
- ***Very High Magnitude of Change – A change in the view that has a dominating or overbearing influence on the overall view.***

20. Using this set of criteria, determining levels of magnitude is primarily dependant on how prominent the lighting associated with the development would be in the landscape, and what may be judged to flow from that prominence or otherwise.

21. For clarification, the use of the term 'prominent' relates to how noticeable the lighting associated with the development would be. This is affected by how close the viewpoint is to the development but not entirely dependent on this factor. Other modifying factors include: the focus of the view, visual screening and the nature and scale of other landscape features and visible lighting within the view. Rather than specifying crude bands of distance at which the turbines will be dominant, prominent or incidental to the view etc, the prominence of the turbines in each view is described in detail for each viewpoint or receptor group taking all the relevant variables into consideration.

Consideration of the Duration and Reversibility of effect

22. Prior to the publication of GLVIA3, LVIA practice had evolved over time in tandem with most other environmental disciplines to consider significance principally as a function of two factors, namely: the sensitivity of the receptor and the magnitude of the effect (the term 'magnitude' being a word most commonly used in LVIA and most other environmental disciplines to describe the size or scale of an effect).

23. The flow diagram on page 39 of GLVIA3 now suggests that the magnitude of effect is a function of three factors (the size/scale of the effect, the duration of the effect and the reversibility of the effect). This however is somewhat problematic in the context of assessing wind energy development. This is because wind energy developments are generally consented for a time limited period and are largely reversible at the end of their operational period. Whilst this is a material consideration in the planning balance it does not however reduce the scale of the effect during the period in which the scheme is operational (i.e. the 'magnitude' of the effect in the traditional and commonly understood sense of the word). In this regard, it would be incorrect to report a lesser magnitude of change to the view during the operational phase as a result of the time limited period of the effect, or the relative reversibility of the effect.

24. The approach proposed to be taken in this assessment is therefore to consider magnitude of effect solely as the scale or size of the effect in the traditional sense of the term 'magnitude'.

Level of effect

25. The purpose of an LVIA when produced in the context of an EIA is to identify any significant effects on landscape and visual amenity arising from the proposed development.

26. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 do not define a threshold at which an effect may be determined to be significant. In certain other environmental disciplines there are regulatory thresholds or quantative standards which help to determine the threshold of what constitutes a significant effect. However, in LVIA, any judgement about what constitutes a significant effect is the judgement of a competent and appropriately qualified professional assessor.

27. The level (relative significance) of the landscape and visual effects is determined by combining judgements regarding sensitivity of the landscape or the viewer, the magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.

28. The level (relative significance) of effect shall be described as Major, Major/Moderate, Moderate, Moderate/Minor, Minor, Slight/No Effect or No Effect. No Effect may also be recorded as appropriate where the effect is so negligible it is not even noteworthy.

29. In the assessment, those effects described as Major, Major/Moderate and in some cases Moderate may be regarded as significant effects as required by the EIA Regulations. These are the effects which the authors of the LVIA consider to be most material in the decision making process.

Production of the Zone of Theoretical Visibility (ZTV) Plan

30. A Zone of Theoretical Visibility (ZTV) illustrates the extents from which a feature (in this case the visible lighting from several wind turbines) would theoretically be visible within a defined study area.

31. ZTVs are generated assuming a 'bare ground' terrain model. This means that the ZTVs presented are generated from topographical data only and they do not take any account of vegetation or the built environment, which may screen views of the development. They are, as such, a 'worst case' zone of visual influence and considerably over-emphasises the actual visibility of the scheme. In reality trees, hedges and buildings may restrict views of the development from many of the areas rendered as within the ZTV.

32. A further assumption of ZTVs is that climatic visibility is 100% (i.e. visibility is not impeded by moisture or pollution in the air). In reality, such atmospheric conditions are relatively rare. Mist, fog, rain and snow are all common weather occurrences, which would regularly restrict visibility of the lighting associated with the development from some of the areas within the ZTV; this being an incrementally more significant factor with distance from the site. Atmospheric pollution is not as significant as it is in other parts of the country but is still present and would also restrict actual visibility on some occasions, again more so with distance from the site.

33. A ZTV shall be generated using specialist computer software package 'WindFarm' by ReSoft Ltd. The programme uses topographical height data (OS Terrain 50) to build a terrain model. The programme then renders the model using a square grid to illustrate whether the turbine lighting would be visible in each 50m x 50m square on the grid for a specified distance in every direction from the site.

34. A digital ZTV shall be prepared to illustrate the theoretical visibility of the turbine lighting for a radius of 10km around the site. It should be noted that when light travels from its source it diminishes in intensity,

limiting the area that its source can illuminate, a process known as 'light attenuation' or 'fall-off'. Therefore, whilst the ZTV would not illustrate any reduction in intensity it should be recognised that the aviation lighting would diminish in intensity with distance from the wind farm.

35. It should be noted that there are several limitations to the use of ZTVs. For a discussion of these limitations please refer to Visual Representation of Wind farms – Version 2.2 (SNH February 2017). In particular, it should be noted that the ZTV plan shall simply illustrate theoretical visibility and will not imply or assign any level of significance to those areas identified as being within the ZTV. A ZTV is a tool to assist the Landscape Architect to identify where the turbine lighting would potentially be visible from, however the assessment of landscape and visual effects shall not rely solely on the ZTV and in all cases professional judgement shall be used to evaluate the significance of effects.

Production of the Dusk Period Visualisations

Introduction

36. SNH Guidance, Visual Representation of Wind Farms, Version 2.2, February 2017, considers the matter of visible turbine lighting at paragraphs 174 to 177. This highlights that '*Where an illustration of lighting is required, a basic visualisation showing the existing view alongside an approximation of how the wind farm might look at night with aviation lighting may be useful'.* It goes on to note that *'This is only likely to be required in particular situations where the wind farm is likely to be regularly viewed at night (e.g. from a settlement, transport route) or where there is a particular sensitivity to lighting (e.g. in or near a Dark Sky Park or Wild Land Area)'.* It is also clear that ***'Not all viewpoints will need to be illustrated in this way'.***

37. The following section provides background information in relation to the Dusk Period Visualisations which it is proposed are prepared to illustrate the visible lighting proposed as part of the wind farm. The text explains how the photography shall be taken and how the visualisations are to be prepared and presented. It includes instructions for how it is expected that the visualisations should be viewed and explains the limitations of the visualisation material.

Viewpoints to be Illustrated with Dusk Period Visualisations

38. The starting point for consideration for which locations should be illustrated with dusk period visualisations was the locations proposed as assessment viewpoints for the main daytime period visual assessment. Of these viewpoints a review was then undertaken in order to establish which were likely to be representative of visual receptors during low light conditions. In this regard, viewpoints at distances of beyond 10km from the site were discounted, along with viewpoints at hills summits and on long distance footpaths which would be unlikely to be visited after daylight hours.

39. Following this review, it is considered that the following viewpoints would be most appropriate for the production of Dusk Period Visualisations in addition to daytime visualisations:

- Viewpoint 1: Coalburn, Muirburn Place;
- Viewpoint 4: Minor road, Brackenridge; and
- Viewpoint 13: Victory Park, Muirkirk

Dusk Period Photography

40. SNH advises that *'The visualisation should use photographs taken in low light conditions, preferably when other artificial lighting (such as street lights and lights on buildings) are on, to show how the wind farm lighting will look compared to the existing baseline at night. It is only necessary to illustrate visible lighting, not infrared or other alternative lighting requirements'.* It goes on to note that *'We have found that*

approximately 30 minutes after sunset provides a reasonable balance between visibility of the landform and the apparent brightness of artificial lights, as both should be visible in the image. It is important that the photographs represent the levels of darkness as seen by the naked eye at the time and the camera exposure does not make the image appear artificially brighter than it is in reality. It can also be helpful to note the intensity of other lights in the area to enable comparison (e.g. television transmitters) as this can aid the assessment process'.

41. In this context, the following text explains how the baseline photography shall be taken for each viewpoint to be illustrated with a visualisation.

42. Each viewpoint to be illustrated with a visualisation shall be visited during the 'dusk period' and photographs taken at regular intervals as the light levels decrease across the dusk period. In particular, we shall seek to gather photographs during the period where street lighting and other light sources of visible light in the baseline are illuminated, but the landform remains partially visible. The ambient light conditions shall be recorded during each round of photography with a light meter to seek to ensure consistency across the visualisations prepared.

43. Baseline photographs of the existing view shall be taken using a high quality Canon 5D Mark II digital camera with a Canon EF 50mm f/1.4 USM lens. In accordance with SNH guidance, this camera shall have a full frame digital sensor.

44. As far as possible, photographs shall be taken in good weather and clear visibility conditions.

45. Neutral density graduated filters shall be used as appropriate at some viewpoints to balance the exposure within some scenes – typically where there is a contrast between bright sky and darker landform. Other than this no other filters shall be used during the photography.

46. Photographs shall be captured in high resolution JPEG format and as RAW metadata files.

47. At each viewpoint the camera shall be mounted on a levelled tripod at a height of approximately 1.5m above ground level (providing an approximation of average adult eye level).

48. The camera shall be set up on a panoramic rotating head and photographs taken at 30 degree increments of rotation from left to right.

49. In each case the camera focus shall be locked on the distant horizon (infinity). In doing so the photographs are in each case focussed on the development site whilst very close objects in the foreground may in some cases be out of focus. This approach is in line with best practice photography techniques. The exposure shall be set correctly for the centre of the development site and then locked off so that it remained constant as the camera is rotated through the panorama.

Stitching of Panoramas and Post-Photographic Processing

50. Each of the panoramic images presented for the Photographic Record and used for the Visualisations shall be comprised of three single frame photographs stitched together and then cropped down to a particular horizontal and vertical field of view.

51. The panoramic baseline photographs which illustrate a 90 degree horizontal angle of view shall be stitched in cylindrical projection as per the SNH guidance.

52. The photomontages which show a 53.5 degree horizontal field of view shall be based on the same single frame panoramic photographs but stitched in planar projection in accordance with the SNH guidance.

53. In some cases a degree of post photography processing of the raw image files may be undertaken to enhance the quality of the baseline photographs. As stated in the SNH guidance:

'Photographic processing involves judgements - there is no process by which a 'pure' photograph can be produced without the application of human decision-making, from exposure timing to the specification of the camera, and whether this is applied manually or automatically.....'

'In reality there is no way to avoid a photograph being enhanced as this is an integral part of photography and photomontage production.'

54. The extent of image enhancement undertaken in the production of the any photomontages will however be limited to that which would conventionally occur in a darkroom to improve the clarity of an image, and will not in each case change the essential character of the image. Overall, a minimum of post-photography image enhancement will take place and during the stitching process none of the photographs shall be distorted in terms of scaling (other than that which is an inherent and unavoidable product of stitching photography in planar projection).

Production of Wirelines and Photomontages

Wirelines

55. A wireline visualisation (sometimes also referred to as a wireframe visualisation) is a computer generated 3D outline of a particular structure (in this case a wind farm) placed on top of a 3D ground terrain model, which again is represented by a wireline. No rendering is given to any of the surfaces.

56. The wireline images of the proposed turbines (as well as any other cumulative turbines modelled) will be generated utilising the actual dimensions of the proposed turbines and a model of the structures placed in position over a ground terrain model generated from Ordnance Survey Terrain 50 DTM data.

57. The coordinates of the viewpoints will be recorded using a Global Positioning System (GPS) in the field. Checks on these coordinates will be made with reference to Google Earth. These coordinates will be used to set up viewpoints in the model from which to view the turbines. The wirelines will be generated using specialist computer software package 'WindFarm' by ReSoft Ltd.

58. The wireline images are generated on a bare ground model and therefore do not take account of any vegetation or the built environment between the viewpoint and the development. As such, they represent a worst case view.

59. For each of the viewpoints which are illustrated with a Visualisation, a wireline will be presented to scale beneath a baseline photograph to illustrate the view. The wireline images illustrate the anticipated scale and position of the turbines in relation to the terrain.

Dusk Period Photomontages

60. In simple terms, a photomontage is the superimposition of a rendered, photorealistic, computer generated model of a development (in this case a wind farm with visible lighting) on to a baseline photograph to illustrate how it will appear in the surrounding landscape context.

61. The production of the photomontages shall begin with the generation of a 3D digital ground terrain model and wireline images of the turbines, using ReSoft Ltd WindFarm software (as described above). The model of the structures is then rendered, and the lighting levels set appropriate to the date, time and orientation on which the photograph was taken.

62. Using world co-ordinates in the computer modelling programme, the photographic viewpoints for which a photomontage is to be prepared is replicated such that a view is set up looking at the structures from exactly the same location as where the baseline photograph was taken from. The view from the model is then superimposed over the original photograph and edited as necessary in Adobe Photoshop to give a

final photomontage. Several known landmarks in the far distance of the baseline photographs are recorded on site using a GPS and used to check that the positioning and scale of the structures is correct.

63. Whilst every effort shall be made to ensure the accuracy of the photomontages, it must be appreciated that no photomontage could ever claim to be 100% accurate as there are a number of technical limitations in the model relating to the accuracy of information available from Ordnance Survey and from the GPS. In particular, it should be recognised that baseline photographs on which photomontages are based can, at best, only ever be a 'flattened' 2D representation of what the eye sees in 3D on site. A photograph will never capture as much detail as the eye would see in the field, it therefore follows that a photomontage can never truly capture the sense of perspective and detail which would be possible in reality.

64. Additionally, it has been established during the field work undertaken for previous similar studies that dusk period photographs of visible lighting do not always capture the extent to which the eye perceives light sources during the dusk period. Often photography will appear to show the lighting to be more recessive than it is actually perceived in the field. The photomontages therefore do not seek to replicate the manner in which a dusk period photograph would capture the aviation lighting, rather they seek to replicate the manner in which the lighting is perceived when it is viewed in the field.

65. In some cases, the visibility of the turbines may also be slightly digitally enhanced to ensure that they are visible when printed out.

66. Each of the photomontages should be viewed from the stated viewing distance to give an accurate representation of what the development will look like. However, the photomontages are simply a tool to assist the Landscape Architect in their assessment of effects. The assessment of visual effects does not rely solely on the accuracy of the photomontages as it is ultimately professional judgement which is used to evaluate the significance of effects.

Presentation of the Visualisation Sheets

67. For each Dusk Period Viewpoint Visualisation, the following visualisation sheets shall be presented:

Sheet 1: Baseline Photograph of the Existing Dusk Period View and Cumulative Wireline of the Proposed Scheme and all other Operational or Proposed Wind Farms

68. The baseline photograph is an unedited existing dusk period view from the viewpoint. The image illustrates a 90 degree horizontal field of view and a 25 degree vertical field of view. This image is presented in cylindrical projection and the principal viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 500mm when the image is curved through the same radius.

69. A cumulative wireline image of the proposed development, and all other operational and proposed wind farms is set out directly beneath the corresponding baseline view. This image also presents a 90 degree horizontal field of view. This sheet presents the information required of the 'Baseline Panorama and Wireline' as set out in Annex C of the SNH guidance. Both of these images are presented in cylindrical projection and the principal viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 500mm when the image is curved through the same radius.

Sheet 2: Dusk Period Photomontage of the Proposed Scheme

70. This sheet provides an enlarged and cropped dusk period photomontage of the proposed development. The image illustrates a 53.5 degree horizontal field of view and an 18 degree vertical field of view. It is presented in planar projection. As such the image should be viewed on a flat surface. The principal

viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 812.5mm. This sheet presents the information required of the 'A1 Panorama' as set out in Annex C of the SNH guidance.

71. The dusk period photomontage shall include for other proposed cumulative sites which would require visible lighting. These would include the Hagshaw Hill Repowering scheme where an application is due to be submitted in Autumn 2018.

Limitations of the Visualisations

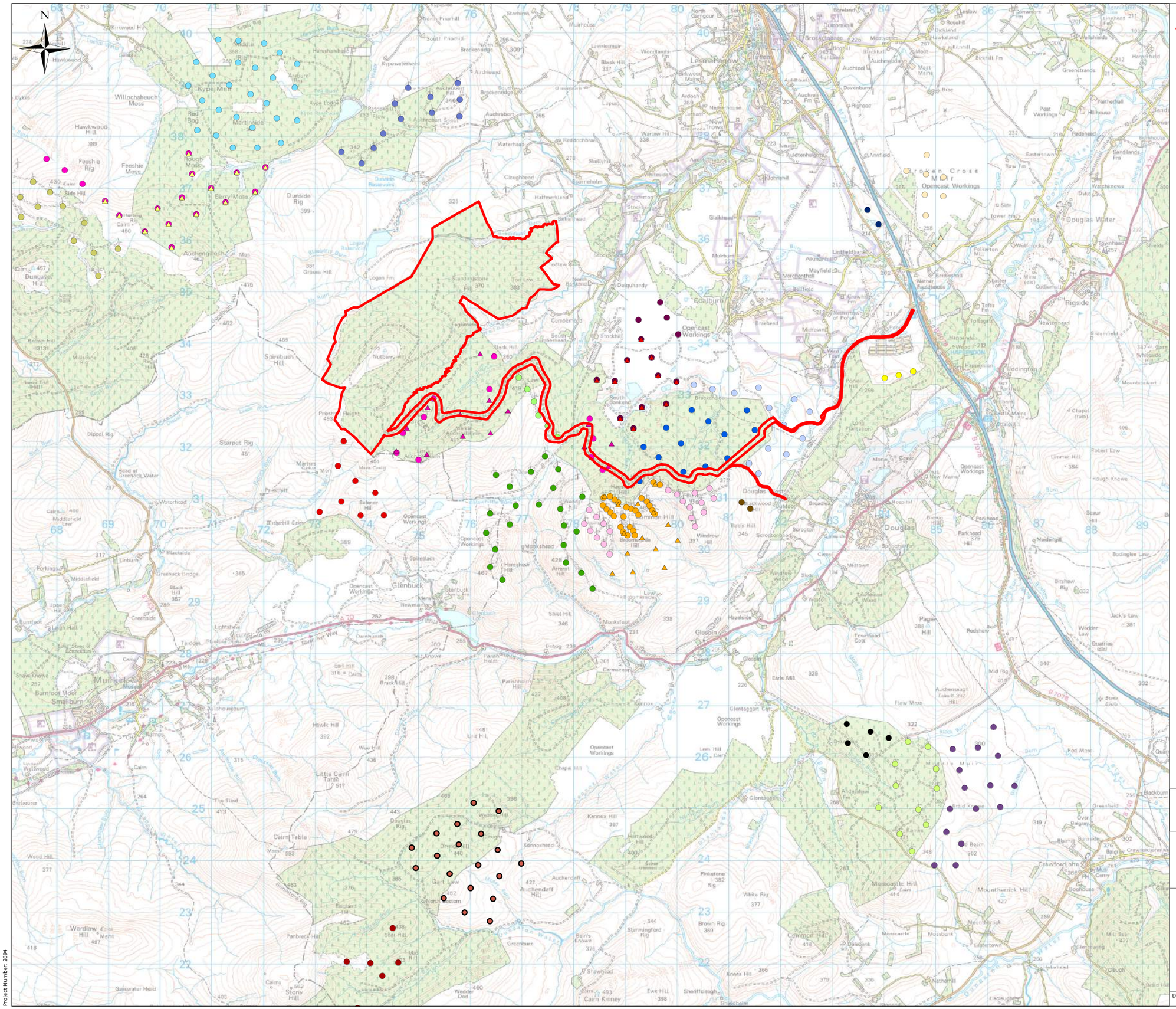
72. Annex A of 'Visual Representation of Wind Farms, Version 2.2 (SNH, February 2017) sets out a summary of the key limitations of visualisations and recommends that these are set out for each windfarm application. The following text is therefore reproduced from Annex A of the aforementioned SNH guidance:

'Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:

- *A visualisation can **never show exactly** what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;*
- *The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but **can never be 100% accurate**;*
- *A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move;*
- *The viewpoints illustrated are representative of views in the area, but cannot represent visibility at all locations;*
- *To form the best impression of the impacts of the wind farm proposal these images **are best viewed at the viewpoint location shown**;*
- *The images **must** be printed at the right size to be viewed properly (260mm by 820mm);*
- *You should hold the images **flat at a comfortable arm's length**. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression.*
- *It is preferable to view printed images rather than view images on screen. If you do view images on screen you should do so using a normal PC screen with the image enlarged to the full screen height to give a realistic impression. Do not use a tablet or other device with a smaller screen to view the visualisations described in this guidance'.*

73. It should also be noted that the quality of all printed visualisations is also dependent on the printing methods, paper and ink used.

Figures



KEY

Site Boundary

Operational or Consented Development

- Existing Hagshaw Hill Wind Farm
- Hagshaw Hill Wind Farm Extension
- Hazelside Farm Turbines (2 consented, 1 operational)
- Douglas West Wind Farm
- Repowered Hagshaw Hill Wind Farm
- Cumberhead Wind Farm
- Dalquhandy Wind Farm
- Galawhistle Wind Farm
- Nutberry Wind Farm
- Poniel Wind Farm
- Andershaw Wind Farm
- Auchrobert Wind Farm
- Dungavel Wind Farm
- Middle Muir Wind Farm
- Kype Muir Wind Farm
- Kype Muir Extension
- Penbreck Wind Farm
- Kennoxhead Wind Farm
- Birkhill Wind Farm
- Broken Cross (Small Turbines) Wind Farm
- Revised Dalquhandy Wind Farm

Development in Planning

- Douglas West Wind Farm Extension
- Hare Craig Wind Farm
- Broken Cross Wind Farm
- Revised Cumberhead Wind Farm
- Glentaggart Wind Farm
- Revised Kype Muir Extension

0 1.5 3 km

Scale 1:70,000 @ A3

Cumberhead West Wind Farm
Scoping Report

Figure 1.1

The Proposed Development in the Context of the Hagshaw Cluster

Date:	Drawn by:	Checked by:	Version:
16/06/2020	EW	ST	V1

Project Number: 2694

N

KEY

Site Boundary

0 1 2 km

Scale 1:50,000 @ A3

Cumberhead West Wind Farm
Scoping Report

Figure 2.1

Site Location Plan

Date:	Drawn by:	Checked by:	Version:
12/06/2020	ST	LS	V1

Project Number: 2694

N

Coalburn Moss SSSI & SAC

Birkenhead Burn SSSI & GCR

Birk Knowes SSSI & GCR

Dippal Burn GCR

Slot Burn GCR

Muirkirk Uplands SSSI

Muirkirk and North Lowther Uplands SPA

Shiel Burn SSSI

Ree Burn and Glenbuck SSSI & GCR

Ree Burn - Glenbuck Loch GCR

Miller's Wood SSSI

Muirkirk Uplands SSSI

Muirkirk and North Lowther Uplands SPA

KEY

- Site Boundary
- 2 km turbine buffer
- 5 km turbine buffer

Cultural Heritage:

- Listed Building Grade A
- Listed Building Grade B
- Listed Building Grade C
- Scheduled Monument
- Conservation Area

Ecological:

- Special Area of Conservation (SAC)
- Special Protected Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland

Geological & Hydrological:

- Watercourses (within site)
- Watercourses 50 m buffer
- Geological Conservation Review Site

0 1.5 3 km

Scale 1:60,000 @ A3

3R Energy

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ITPENERGISED

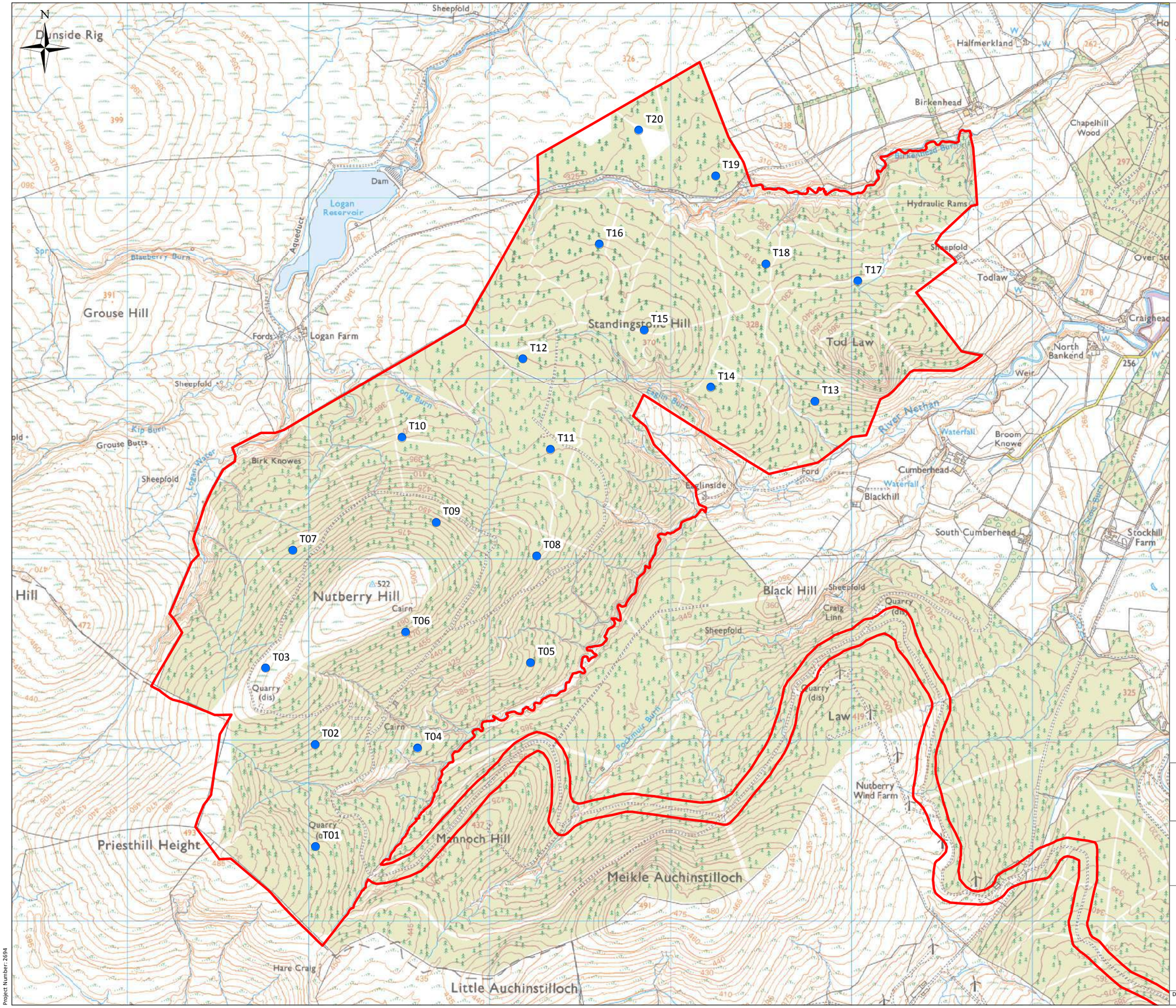
Cumberhead West Wind Farm
Scoping Report

Figure 2.2

Environmental Constraints within 2km & 5km

Date:	Drawn by:	Checked by:	Version:
12/06/2020	ST	LS	V1

Project Number: 2694



KEY

- Site Boundary
- Indicative Turbine Location

0 0.4 0.8 km

Scale 1:20,000 **@ A3**

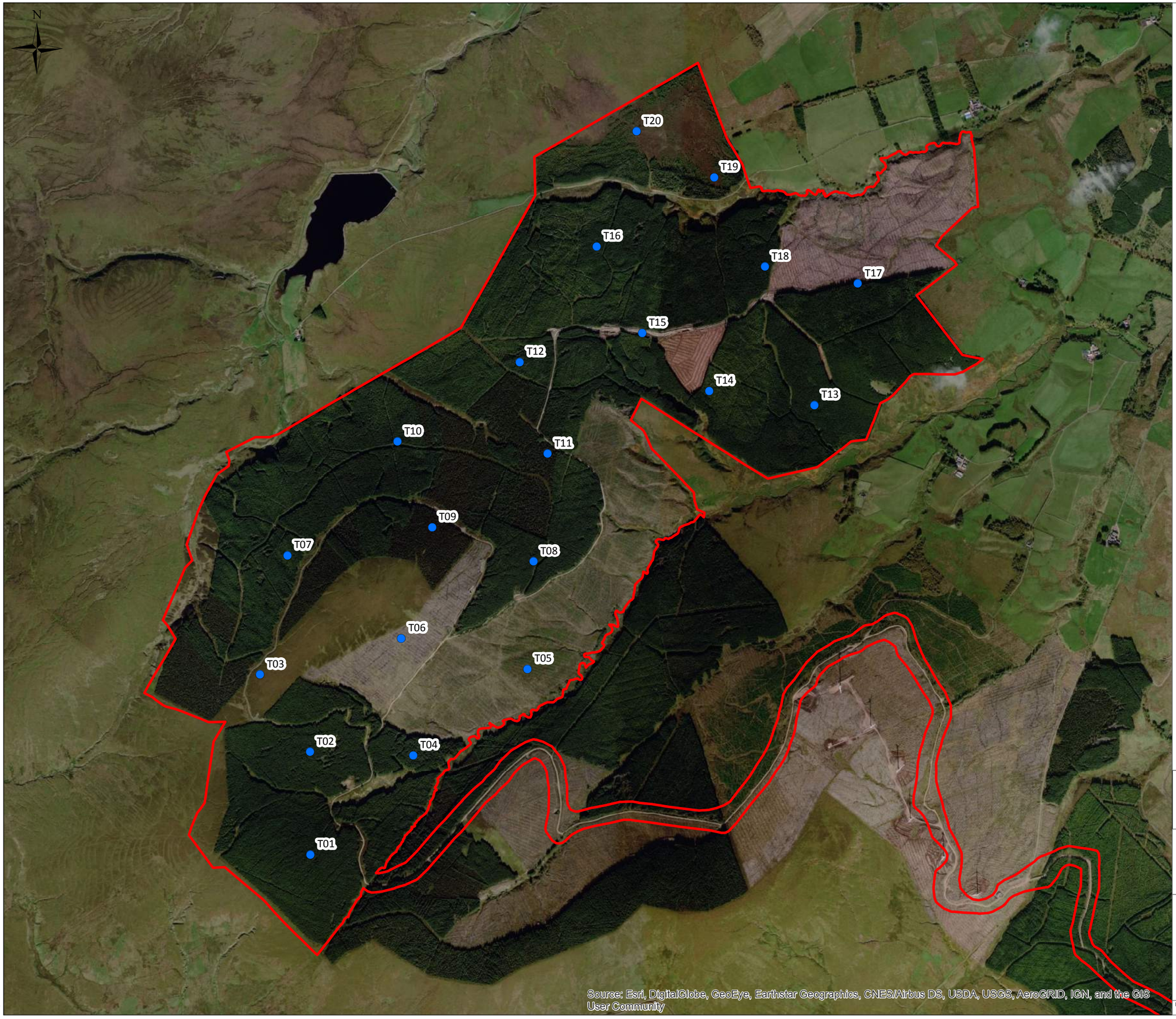
Cumberhead West Wind Farm
Scoping Report

Figure 2.3

Indicative Site Layout

Date:	Drawn by:	Checked by:	Version:
05/06/2020	ST	LS	V1

Project Number: 2694



KEY

- Site Boundary
- Indicative Turbine Location

0 0.4 0.8 km

Scale 1:20,000 **@ A3**

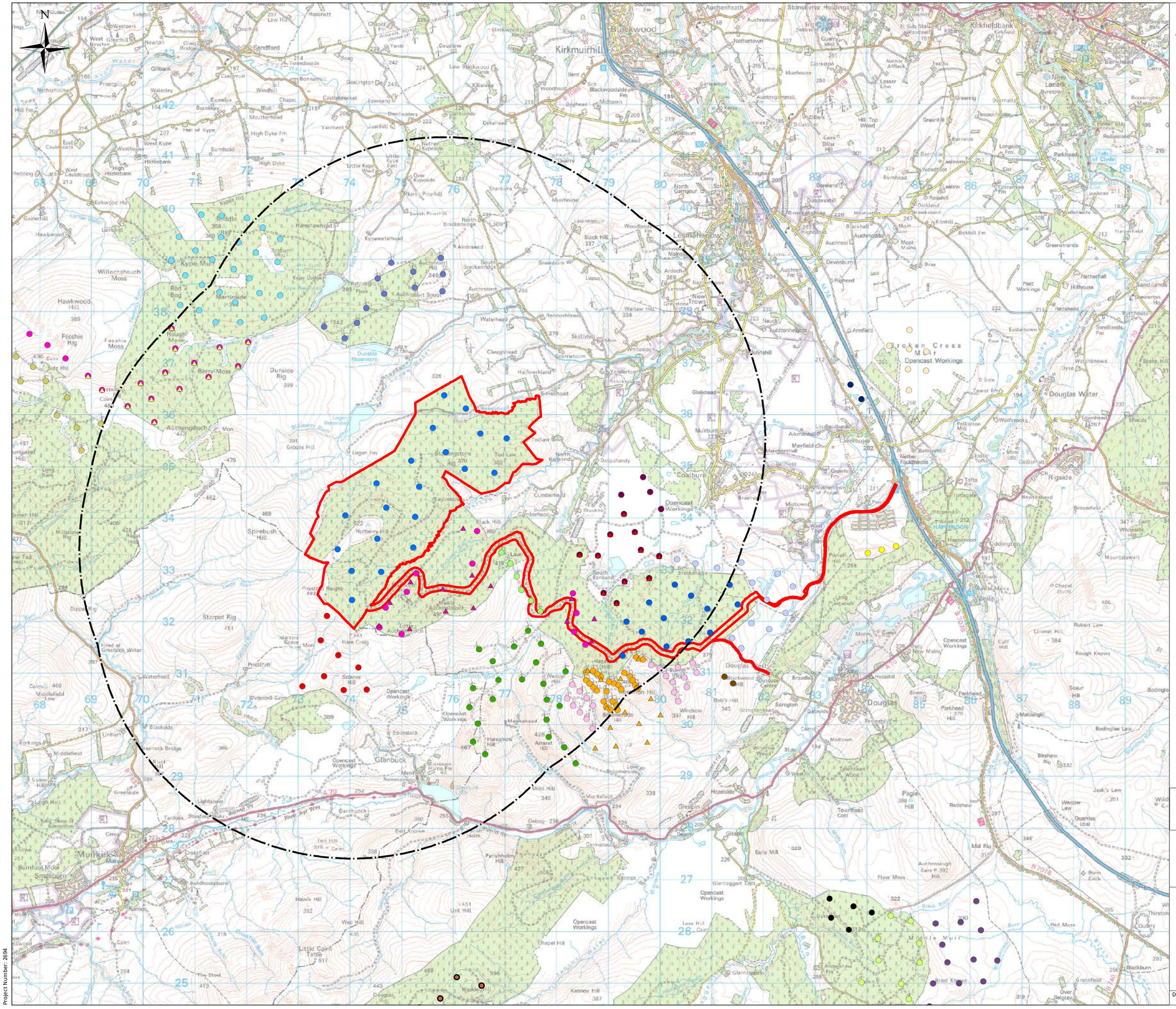
Cumberhead West Wind Farm
Scoping Report

Figure 2.4

Indicative Site Layout (Aerial Backcloth)

Date:	Drawn by:	Checked by:	Version:
05/06/2020	ST	LS	V1

Project Number: 2694



KEY

- Site Boundary
- Indicative Proposed Development Turbine Locations
- 5km Turbine Buffer

Other Local Developments (Consented or Operational)

- Existing Hagshaw Hill Wind Farm
- Hagshaw Hill Wind Farm Extension
- Hazelside Farm Turbines (2 consented, 1 operational)
- Douglas West Wind Farm
- Repowered Hagshaw Hill Wind Farm
- Cumberhead Wind Farm
- Dalquhandy Wind Farm
- Galawhistle Wind Farm
- Nutberry Wind Farm
- Poniel Wind Farm
- Andershaw Wind Farm
- Auchrobert Wind Farm
- Dungavel Wind Farm
- Middle Muir Wind Farm
- Kype Muir Wind Farm
- Kype Muir Extension
- Penbreck Wind Farm
- Kennoxhead Wind Farm
- Birkhill Wind Farm
- Broken Cross (Small Turbines) Wind Farm
- Revised Dalquhandy Wind Farm

Development in Planning

- Douglas West Wind Farm Extension
- Broken Cross Wind Farm
- Revised Cumberhead Wind Farm
- Glentaggart Wind Farm
- Hare Craig Wind Farm
- Revised Kype Muir Extension

0 1.5 3 km

Scale 1:70,000 @ A3

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Cumberhead West Wind Farm
Scoping Report

Figure 2.5

Cumulative Development within 5km

Date:	Drawn by:	Checked by:	Version:
16/06/2020	EW	ST	V1

Project Number: 2694

N

5km

10km

15km

20km

KEY

- Site Boundary and Proposed Turbine Locations
- Study Area Radius
- Planning authority boundaries
- World Heritage Site
- Conservation Areas
- Inventory of Gardens and Designed Landscapes

Local Landscape Areas

Dumfries & Galloway Regional Scenic Areas
- 8 - Thornhill Uplands

South Lanarkshire Special Landscape Areas
- 3 - Upper Clyde Valley and Tinto
- 4 - Douglas Valley
- 6 - Leadhills and the Lowther Hills

South and East Ayrshire Sensitive Landscape Areas
- 1 - Southern Uplands SLA

0 5000 10000 m

Scale 1:160,000@A3

3R Energy Wind • Biomass

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Cumberhead West Wind Farm

Scoping Report

Figure 4.1

Landscape Designations within 20km

Date:	Drawn by:	Checked by:	Version:
16/03/2020	TH	DT	V1

P19-2443.001A

N

5km
10km
15km
20km
25km
30km
35km

KEY

Proposed Turbine Locations

Study Area Radius

Viewpoint locations

1. Coalburn, Muirburn Place
2. M74 Overbridge
3. Lesmahagow - Hillcrest
4. Minor road, Brackenridge
5. B7086, bridge crossing Kype Water
6. B7068, leaving Strathaven
7. A71, bridge crossing Calder Water
8. Black Hill
9. A70, Rigside
10. Tinto Hill
11. Douglas - Hill Street
12. Auchensaugh Hill
13. Victory Park, Muirkirk
14. Nether Wellwood (A70)
15. Cairn Table

Zone of Theoretical Visibility (ZTV) run to blade tip height of 200m

1-3 turbines visible

4-7 turbines visible

8-10 turbines visible

11-14 turbines visible

NB The Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where turbines will be visible from assuming 100% visibility. It is generated using terrain data only and does not take into account any screening that vegetation or the built environment may provide. It is as such a worst case ZTV and the actual extents of visibility are likely to be much less extensive.

Scale 1:275,000@A3

0 5 10 km

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Figure 4.2

Proposed Viewpoint Locations Overlaid on ZTV

Date:	Drawn by:	Checked by:	Version:
16/03/2020	TH	DT	V1

P19-2443_002A

N

Blantyre Muir

Ardoch & Over Enoch

Whitelee

Whitelee Extensions 1 & 2

West Browncastle

Calder Water

Kype Muir Extension

Kype Muir

South Priorhill Farm

North Brackenridge

High Waterhead Farm

Muirhouse Farm

Ladehead Farm

Low Whiteside Farm

Letham Farm

Auchrobert

Auchren Farm

Broken Cross

M74 Eco Park

JJ's Farm

Broken Cross Small Wind Devt.

Birkhill

Nether Fauldhouse

Stoney Hill Farm

Dungavel

Yonderton Farm

Nutberry

Dalquhandy

Poniel

Douglas West

Douglas West Extension

Cumberhead

Hazelside Farm

Hare Craig

Existing Hagshaw Hill & Extension

Repowered Hagshaw Hill

Galawhistle

Hazelside Glentaggart

Middle Muir

Kennoxhead

Andershaw

Priestgill

Penbreck

Leadhills

Lowther Hills (NLEI)

Lethans

Glenmuckloch

Sunnyside

Bankend Rig

Bankend Rig II

Hill Rig (resubmisison)

Lochhead

Black Law

5km

10km

15km

20km

KEY

- Site Boundary and Proposed Turbine Locations
- Study Area Radius
- Operational
- Consented / Under Construction
- Planning
- Consented Schemes Subject To Revised Application

0 5000 10000 m

Scale 1:160,000@A3

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Figure 4.3

Other Wind Farms within 20km

Date:	Drawn by:	Checked by:	Version:
16/03/2020	TH	DT	V1

P19-2443.003B

N

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13 T14 T15 T16 T17 T18 T19 T20

VP 2 VP 3 VP 4 VP 5 VP 6

KEY

- Indicative Turbine Location
- Site Boundary

Survey Area

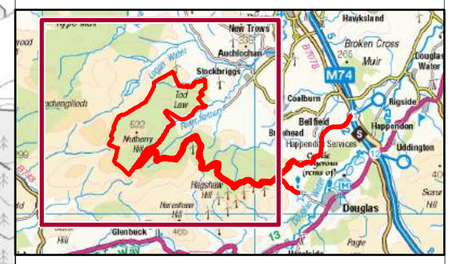
- 2km Survey Area
- 500m Survey Area

Vantage Point (VP)

- VP 2
- VP 3
- VP 4
- VP 5
- VP 6

Viewshed

- Visible Area VP 2
- Visible Area VP 3
- Visible Area VP 4
- Visible Area VP 5
- Visible Area VP 6



0 0.5 1 1.5 km

Scale 1:35,000 @ A3

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Scoping Report

Figure 5.1

Ornithology Survey Areas 2019/2020

Date:	Drawn by:	Checked by:	Version:
12/06/2020	LNF	RD	V2

Project Number: 2694

N

KEY

- Turbine location
- 5km Study Area
- 10km Outer Study Area
- Scheduled Monument
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Garden and Designed Landscape
- Inventory Historic Battlefield
- World Heritage Site
- Property in Care
- Conservation Area

Visibility

- 1 to 5
- 6 to 10
- 11 to 15
- 16 to 20

0 2 4 km

Scale 1:95,000 @ A3

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Figure 7.1
Cultural Heritage:
Designated Heritage Assets within 10km

Date:	Drawn by:	Checked by:	Version:
13/03/2020	CA	GM	V1

Project Number: 2694

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